SHARP SERVICE MANUAL

S3802RCD12MP/

COMMERCIAL MICROWAVE OVEN

MODELS R-CD1200M

In the interest of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

WARNING TO SERVICE PERSONNEL: Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in a severe, possibly fatal, electrical shock. (High Voltage Capacitor, High Voltage Power Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage Harness etc..)

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SHARP CORPORATION

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The contents are subject to change without notice.

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Parts List

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

(a) Do not operate or allow the oven to be operated with the door open.
(b) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary: (1) interlock operation, (2) proper door closing, (3) seal and sealing surfaces (arcing, wear, and other damage), (4) damage to or loosening of hinges and latches, (5) evidence of dropping or abuse.
(c) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity, and connections.
(d) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner
(e) A microwave leakage check to verify compliance with the Federal Performance Standard should be performed on each oven prior to release to the owner.

BEFOR SERVICING

BEFORE SERVICING

Before servicing an operative unit, perform a microwave emission check as per the Microwave Measurement Procedure outlined in this service manual.
If microwave emissions level is in excess of the specified limit, contact SHARP ELECTRONICS CORPORATION immediately @1-800-237-4277.

If the unit operates with the door open, service person should 1) tell the user not to operate the oven and 2) contact SHARP ELECTRONICS CORPORATION and Food and Drug Administration's Center for Devices and Radiological Health immediately.

Service personnel should inform SHARP ELECTRONICS CORPORATION of any certified unit found with emissions in excess of 4mW/cm^2. The owner of the unit should be instructed not to use the unit until the oven has been brought into compliance.

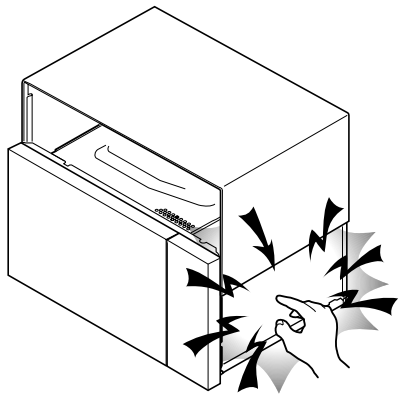
CHAPTER 1. WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in a severe, possibly fatal, electrical shock.

(Example)

High Voltage Capacitor, High Voltage Power Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage Harness etc..

Read the Service Manual carefully and follow all instructions.



Don't Touch !
Danger High Voltage

[1] Before Servicing

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

WARNING: **RISK OF ELECTRIC SHOCK. DISCHARGE THE HIGH-VOLTAGE CAPACITOR BEFORE SERVICING.**

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Whenever troubleshooting is performed the power supply must be disconnected. It may, in some cases, be necessary to connect the power supply after the outer case has been removed, in this event,

1) Disconnect the power supply cord, and then remove outer case.
2) Open the door and block it open.
3) Discharge high voltage capacitor.
4) 4.Disconnect the leads to the primary of the power transformer.
5) Ensure that the leads remain isolated from other components and oven chassis by using insulation tape.
6) After that procedure, reconnect the power supply cord.

[2] When the testing is completed,

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Reconnect the leads to the primary of the power transformer.
5. Reinstall the outer case (cabinet).
6. Reconnect the power supply cord after the outer case is installed.
7. Run the oven and check all functions.

[3] After repairing

1. Reconnect all leads removed from components during testing.
2. Reinstall the outer case (cabinet).
3. Reconnect the power supply cord after the outer case is installed.
4. Run the oven and check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power to HIGH and set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out **Before Servicing** procedure and re-examine the connections to the component being tested.

When all service work is completed and the oven is fully assembled, the microwave power output should be checked and microwave leakage test should be carried out.

CHAPTER 2. MICROWAVE MEASUREMENT PROCEDURE

A. Requirements:

1) Microwave leakage limit (Power density limit): The power density of microwave radiation emitted by a microwave oven should not exceed 1mW/cm^2 at any point 5cm or more from the external surface of the oven, measured prior to acquisition by a purchaser, and thereafter (through the useful life of the oven), 5 mW/cm^2 at any point 5cm or more from the external surface of the oven.
2) Safety interlock switches: Primary interlock relay and door sensing switch shall prevent microwave radiation emission in excess of the requirement as above mentioned, secondary interlock switch shall prevent microwave radiation emission in excess of 5 mW/cm^2 at any point 5cm or more from the external surface of the oven.

B. Preparation for testing:

Before beginning the actual measurement of leakage, proceed as follows:

1) Make sure that the actual instrument is operating normally as specified in its instruction booklet.

   Important:

   Survey instruments that comply with the requirement for instrumentation as prescribed by the performance standard for microwave ovens, 21 CFR 1030.10(c)(3)(i), must be used for testing.
2) Place the oven tray in the oven cavity.
3) Place the load of 275±5 ml (9.8 oz) of tap water initially at 20±5°C (68°F) in the center of the oven cavity.

   The water container shall be a low form of 600 ml (20 oz) beaker with an inside diameter of approx. 8.5 cm (3-1/2 in.) and made of an electrically nonconductive material such as glass or plastic.

   The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4) Set the cooking control on Full Power Cooking Mode
5) Close the door and select a cook cycle of several minutes. If the water begins to boil before the survey is completed, replace it with 275 ml of cool water.

C. Leakage test:

Closed-door leakage test (microwave measurement)

1) Grasp the probe of the survey instrument and hold it perpendicular to the gap between the door and the body of the oven.
2) Move the probe slowly, not faster than 1 in./sec. (2.5 cm/sec.) along the gap, watching for the maximum indication on the meter.
3) Check for leakage at the door screen, sheet metal seams and other accessible positions where the continuity of the metal has been breached (eg., around the switches, indicator, and vents).

   While testing for leakage around the door pull the door away from the front of the oven as far as is permitted by the closed latch assembly.
4) Measure carefully at the point of highest leakage and make sure that the highest leakage is no greater than 4mW/cm^2, and that the secondary interlock switch and the primary interlock relay do turn the oven OFF before any door movement.

NOTE: **After servicing, record data on service invoice and microwave leakage report.**

CHAPTER 3. FOREWORD AND WARNING

FOREWORD

This Manual has been prepared to provide Sharp Electronics Corp. Service Personnel with Operation and Service Information for the SHARP MICROWAVE OVEN, R-CD1200M.

It is recommended that service personnel carefully study the entire text of this manual so that they will be qualified to render satisfactory customer service.

Check the interlock switches and the door seal carefully. Special attention should be given to avoid electrical shock and microwave radiation hazard.

WARNING

Never operate the oven until the following points are ensured.

(A) The door is tightly closed.

(B) The door brackets and hinges are not defective.

(C) The door packing is not damaged.

(D) The door is not deformed or warped.

(E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service personnel.

DANGER

Certain initial parts are intentionally not grounded and present a risk of electrical shock only during servicing. Service personnel - Do not contact the following parts while the appliance is energized;

High Voltage Capacitor, Power Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage Harness;

If provided, Vent Hood, Fan assembly, Cooling Fan Motor.

All the parts marked "⚠" on parts list are used at voltages more than 250V.

Removal of the outer wrap gives access to voltage above 250V.

All the parts marked "*" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

CHAPTER 4. PRODUCT DESCRIPTION

[1] SPECIFICATIONS

ITEM	DESCRIPTION
Power Requirements	Single phase, 60Hz, A.C. only
Power Consumption	1.9kW 120V-16A
Power Output	1200W Operating frequency 2450 MHz
Outside Dimensions	17-1/2" (W) x 20-1/2" (D) x 13-5/8" (H) 445mm (W) x 520mm (D) x 346mm (H) (including feet)
Cooking Cavity Dimensions	14" (W) x 13" (D) x 7-1/8" (H) 355mm (W) x 326mm (D) x 177mm (H)
Control Complement	Touch Control System Digital Display Ten number Pads STOP/CLEAR pad CUSTOM HELP pad START pad SELECT POWER pad (Power level: 0 to 100%) SELECT TIME pad DOUBLE/ TRIPLE QUANTITY pad EXPRESS DEFROST pad SET MEMORY pad
Weight	Approx. 65 lbs/ 29.5 kg
Safety Standard	UL Listed. FCC Authorized DHHS Rules, CFR, Title 21, Chapter 1, Subchapter J NSF Certified, CSA

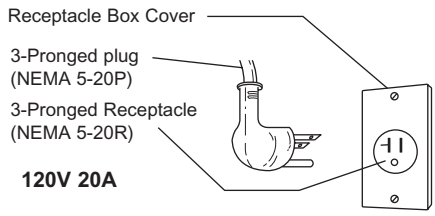
[2] GROUNDING INSTRUCTIONS

1. GROUNDING INSTRUCTIONS

This appliance must be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This appliance is equipped with a cord having a grounding wire with a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with the National Electrical Code and local codes and ordinances.

WARNING: Improper use of the grounding plug can result in a risk of electric shock. The electrical requirements are 120 Volt, 60 Hz, AC only, and 20 Amp or more fused electrical supply. It is recommended that a separate circuit serving only this appliance be provided. When installing this appliance, observe all applicable codes and ordinances. If it is necessary to use an extension cord, use only a 3-wire extension cord that has a 3-blade grounding plug and a 3-slot receptacle that will accept the plug on the appliance. The marked rating of the extension cord should be AC120 Volt 20 Amp. Consult a qualified electrician or serviceman if the grounding instructions are not completely understood or if doubt exists as to whether the appliance is properly grounded.

Plug Configuration

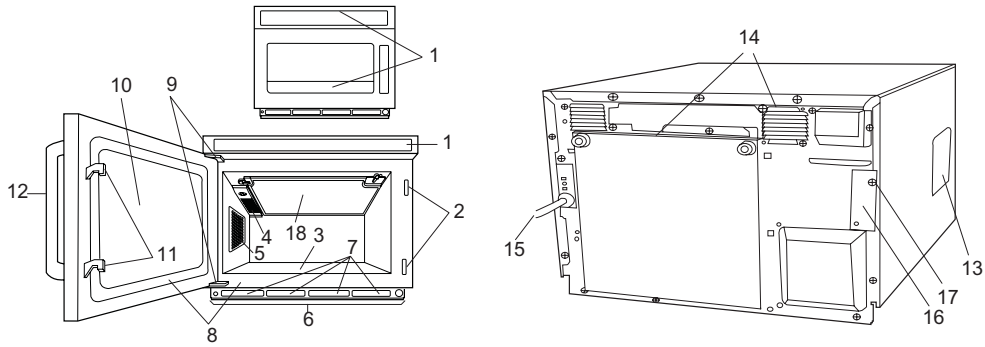


Radio or TV Interference

Should there be any interference caused by the microwave oven to your radio or TV, check that the microwave oven is on a different electrical circuit, relocate the radio or TV as far away from the oven as feasible or check position and signal of receiving antenna.

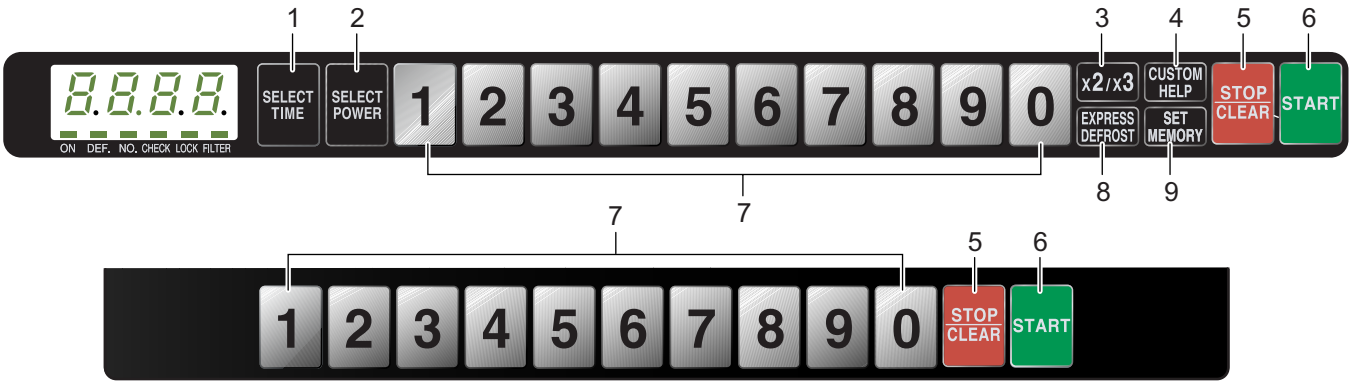
[3] OVEN DIAGRAM

1. OVEN



1. Touch control panels
2. Door latch openings
3. Ceramic shelf
4. Splash cover
5. Oven light
6. Air intake filter
7. Air intake openings
8. Door seals and sealing surfaces
9. Door hinges
10. Oven door with see-through window
11. Door latches
12. Door handle
13. Service window for replacing the oven light bulb
14. Ventilation openings
15. Power supply cord
16. Mounting plate
17. Screw for mounting plate
18. Oven ceiling cover

2. TOUCH CONTROL PANEL



1. SELECT TIME pad
2. SELECT POWER pad
3. DOUBLE/TRIPLE QUANTITY pad
4. CUSTOM HELP pad
5. STOP/CLEAR pad
6. START pad
7. Ten number pads
8. EXPRESS DEFROST pad
9. SET MEMORY pad

CHAPTER 5. OPERATION

[1] DESCRIPTION OF OPERATING SEQUENCE

The following is a description of component functions during oven operation.

1. OFF CONDITION

(For details, refer to Figure O-1)

Closing the door activates the door sensing switch and secondary interlock switches (1), (2). (In this condition, the monitor switches (1) & (2) contacts are opened.) When the oven is plugged in, and the rated voltage is supplied to the switching power supply unit through the noise filter, (figure O-1). The switching supply unit supplies D.C. voltage (approx. 24V) to the relay unit. And the display will show " . ".

2. COOKING CONDITION

(For details, refer to Figure O-2)

Press SELECT TIME pad. Enter cooking time by pressing the number pads. Press the SELECT POWER pad. Enter power level by pressing the number pad. When the START pad is pressed, the following operations occur:

1. The contacts of relays are closed. And the oven lamp and the antenna motors connected to the relays are turned on (For details, refer to Figure O-2).
2. D.C. voltage is supplied to the fan motors, exhaust fan and exhaust motor from the control unit.
3. Rated voltage is supplied to the primary winding of the power transformer and is converted to about 3.43 volts output on the filament winding, and approximately 2080 volts on the high voltage winding.
4. The filament winding voltage heats the magnetron filament and the H.V. winding voltage is sent to a voltage doubler circuit.
5. The microwave energy produced by the magnetron is channelled through the waveguide into the cavity feed-box, and then into the cavity where the food is placed to be cooked.
6. Upon completion of the cooking time, the oven will revert to the OFF condition. The fan motors, exhaust fan and the exhaust motor will operate at least for 1 minute.
7. When the door is opened during a cook cycle, monitor switches (1) & (2), door sensing switch, secondary interlock switches (1), (2) and primary interlock relay are activated with the following results. The circuits to the high voltage components are de-energized.
8. The monitor switch (1) is electrically monitoring the operation of the secondary interlock switch (1) and primary interlock relay, and monitor switch (2) is electrically monitoring the operation of the secondary interlock switch (2) and primary interlock relay, and monitor switches (1), (2) are mechanically associated with the door so that it will function in the following sequence.
   1) (1) When the door opens from a closed position, the contacts of the primary interlock relay and secondary interlock switches (1), (2) open. Then the monitor switch contacts close.
   2) (2) When the door is closed from the open position, the monitor switches (1), (2) contacts first open, and then the contacts of the secondary interlock switches (1), (2) close.

If the secondary interlock switches (1), (2) and primary interlock relay fail with their contacts closed when the door is opened, the closing of the monitor switches (1), (2) contacts will form a short circuit through the monitor fuse, secondary interlock switches (1), (2) and primary interlock relay, causing the monitor fuse to blow.

3. DOOR OPEN CONDITION

When the door is opened, the contacts of the door sensing switch open, initiating the following:

1. A signal is input to the control unit energizing the coil of shutoff relay (RY-4).
2. The shut-off relay (RY-4) contacts close completing circuits to turn on the oven lamp and antenna motors.
3. If the door remains open, 60 seconds later the control unit de-energizes shut-off relay (RY-4) turning off the oven lamp and antenna motors.

4. VARIABLE POWER COOKING

When Variable Cooking Power is programmed, the rated voltage A.C. is supplied to the power transformer intermittently through the contacts of relay (RY-2, RY-3). Relays RY-2 and RY-3 are operated by the control unit within an interval 48 second time base. Microwave power operation is as follows:

VARI-MODE	ON TIME	OFF TIME
100%	48 sec.	0 sec.
90%	44 sec.	4 sec.
80%	40 sec.	8 sec.
70%	36 sec.	12 sec.
60%	32 sec.	16 sec.
50%	26 sec.	22 sec.
40%	22 sec.	26 sec.
30%	16 sec.	32 sec.
20%	12 sec.	36 sec.
10%	8 sec.	40 sec.
0%	0 sec.	48 sec.

NOTE: **The ON/OFF time ratio does not exactly correspond with the percentage of microwave power, because approx. 3 seconds are needed for heating of the magnetron filament.**

5. TWO MAGNETRON OPERATION SYSTEM

Two magnetrons (1), (2) are equipped in order to get higher microwave power output. The primary windings of the power transformers (1), (2) are connected so that each magnetron can be oscillated alternatively according to the frequency of the power supply. Refer to the Figure B-1.

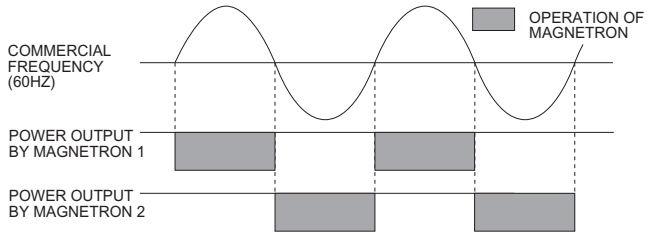


Figure B-1. Operation of Magnetron

[2] OVEN SCHEMATIC

1. Off Condition

SCHEMATIC
NOTE: CONDITION OF OVEN 1. DOOR CLOSED 2. “ . “ APPEARS ON DISPLAY

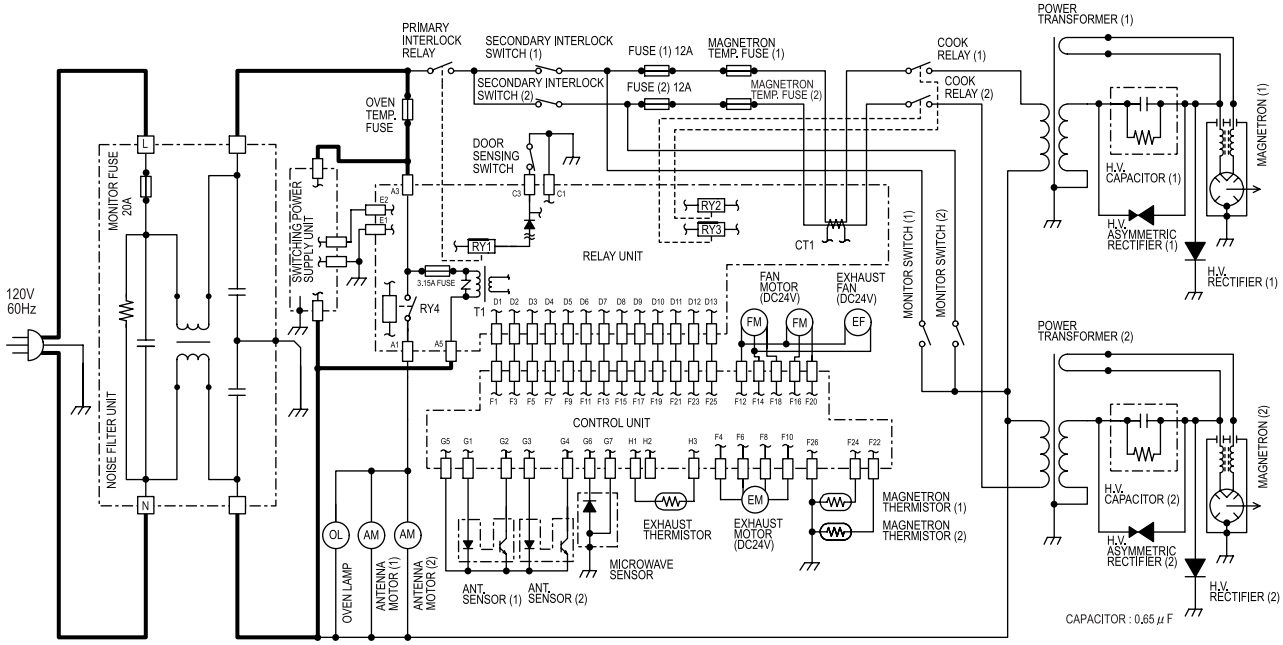


Figure O-1. Oven Schematic-Off Condition

2. Cooking Condition

SCHEMATIC
NOTE: CONDITION OF OVEN 1. DOOR CLOSED. 2. SELECT TIME PAD TUCHED.. 3. COOKING TIME PROGRAMMED. 4. START PAD TOUCHED.

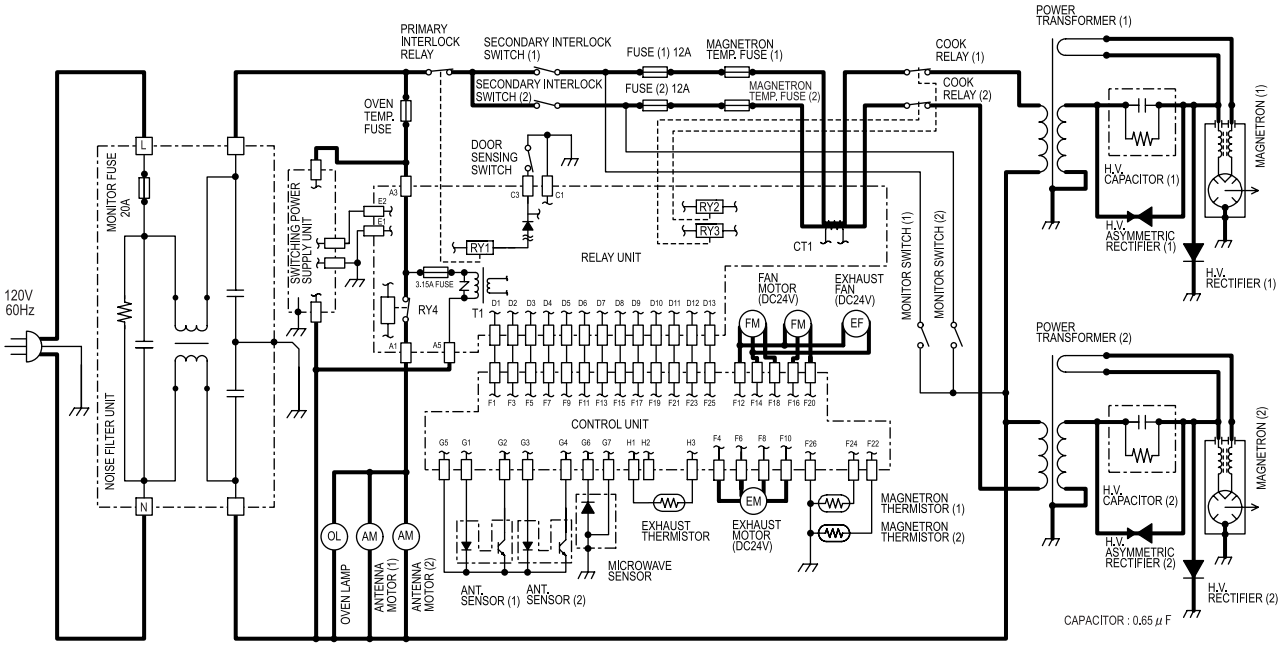


Figure O-2. Oven Schematic-Cooking Condition

[3] DESCRIPTION AND FUNCTION OF COMPONENTS

1. DOOR OPEN MECHANISM

1. The handle lever is pulled.
2. The upper and lower latch heads are lifted up by the linked latch lever.
3. The latch lever is lifted up by the handle lever.
4. Now both latch heads are lifted up, so they can be released from the latch hook.
5. Now the door can be opened.

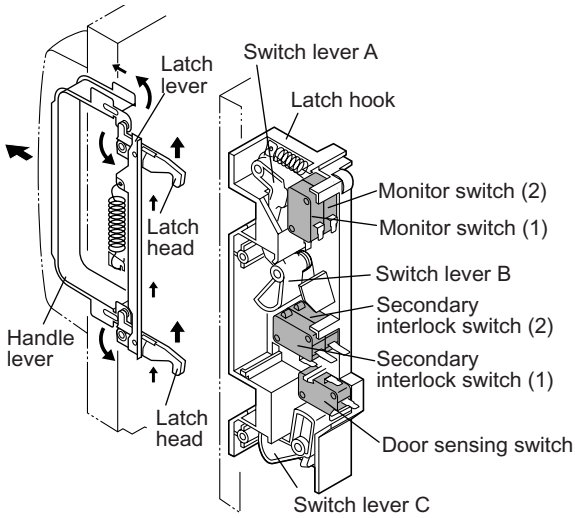


Figure D-1. Door Open Mechanism

2. DOOR SENSING SWITCH

The door sensing switch is activated by the latch head of the door and switch lever C. When the door is opened, the contacts of the switch open and interrupt the circuit to the coils of the primary interlock relay. The contacts of the primary relay then open and interrupt the circuit to the primary winding of the power transformers.

3. SECONDARY INTERLOCK SWITCHES (1), (2)

The secondary interlock switches (1), (2) are activated by the upper latch head of the door and switch lever B. When the door is opened, the contacts of the switch open and interrupt the circuit to the primary winding of the power transformers (1), (2).

4. MONITOR SWITCHES (1), (2)

The monitor switches (1), (2) are mounted in the upper position of the latch hook. The monitor switches are activated by the upper latch head of the door and switch lever A. When the door is opened, the contacts of the monitor switches close. Monitor switch (1) is intended to render the oven inoperative by means of blowing the monitor fuse, when the contacts of the primary interlock relay and secondary interlock switch (1) fail to open when the door is opened. Monitor switch (2) is intended to render the oven inoperative by means of blowing the monitor fuse, when the contacts of the primary interlock relay and secondary interlock switch (2) fail to open when the door is opened.

Functions:

With the door shut, the contacts of the door sensing switch and the secondary interlock switches (1), (2) are closed and the contacts of the monitor switches (1), (2) are open.

1. When the door is opened, the contact of the door sensing switch and secondary interlock switches (1), (2) are opened first, then the contact of the monitor switches (1), (2) are closed.
2. As the door goes to a closed position, the contacts of the monitor switches (1), (2) are opened first, then the contacts of the door sensing switch and the secondary interlock switches (1), (2) close.
3. If the door is opened, and the contacts of the primary interlock relay and secondary interlock switch of the same circuit fail to open, the monitor fuse blows simultaneously with closing of the monitor switch contacts of that circuit (1 or 2).

CAUTION: BEFORE REPLACING A BLOWN MONITOR FUSE TEST THE DOOR SENSING SWITCH, PRIMARY INTERLOCK RELAY, SECONDARY INTERLOCK SWITCHES (1), (2), DOOR SENSING SWITCH AND MONITOR SWITCHES (1), (2) FOR PROPER OPERATION. (REFER TO CHAPTER “TEST PROCEDURE”).

NOTE: MONITOR FUSE AND SWITCH ARE REPLACED AS AN ASSEMBLY.

5. MONITOR FUSE

1. The monitor fuse blows when the contacts (COM-NO) of the primary interlock relay (RY1) and secondary interlock switch remain closed with the oven door open and when the monitor switch closes.
2. If the wire harness or electrical components are short-circuited, this monitor fuse blows to prevent an electric shock or fire hazard.

6. MAGNETRON TEMPERATURE FUSES (1), (2)

The temperature fuses (1), (2) located on the top of the upper and lower waveguide, are designed to prevent damage to the magnetrons (1), (2). If an over heated condition develops in the tube due to blower motor failure, obstructed air ducts, dirty or blocked air intake, etc., the circuit to the magnetrons are interrupted. Under normal operation, the temperature fuses remains closed. However, when abnormally high temperatures are generated within the magnetron, the temperature fuse will open at 302°F (150°C) causing the microwave energy to stop. The defective temperature fuse must be replaced with new rated one.

7. OVEN TEMPERATURE FUSE

The temperature fuse, located on the side of the exhaust duct assembly, is designed to prevent damage to the oven by fire. If the food load is overcooked, by either error in cook time or defect in the control unit, the temperature fuse will open. Under normal operation, the oven temperature fuse remains closed. However, when abnormally high temperatures are generated within the oven cavity, the oven temperature fuse will open at 248°F (120°C), causing the oven to shut down. The defective temperature fuse must be replaced with new rated one.

8. EXHAUST THERMISTOR

The exhaust thermistor is located on the side of the exhaust duct assembly. The temperature in the exhaust duct is detected through the resistance of the thermistor. If the temperature is high, the control panel will display”EE7” and the oven will stop to avoid overheating and catching fire. If the thermistor is open, the control panel will display “EE8” and the oven will stop.

9. MAGNETRON THERMISTOR

The thermistor is a negative temperature coefficient type. The air temperature around the upper and lower magnetrons is detected through the resistance of the thermistor. If the temperature is high, the control panel will display “EE7” and the oven will stop to protect the magnetrons against overheat. If the magnetron thermistor is open, the control panel will display “EE8” and the oven will stop.

10. FAN MOTORS

The fan motors drive blades which draw external cool air into the oven. This cool air is directed through the air vanes surrounding the magnetrons and cools the magnetrons. This air is channelled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

During cooking, they operate. After cooking, they will operate at least for 1 minute and the maximum operating time is 4 minutes. When the temperature of the magnetron thermistor becomes bellow 110°C, the fan motors will stop. These two (2) fan motors are D.C. motors.

11. EXHAUST MOTOR

The exhaust motor is located on the side of the exhaust duct assembly. This motor drives a blade in the exhaust duct assembly. The driven blade draws the external cool air into the oven from the intake duct assembly. Then it sends the air out of the oven through the exhaust duct assembly. During cooking, the exhaust motor operates. After cooking, it will operate at least for 1 minute and the maximum operating time is 4 minutes. When the temperature of the exhaust thermistor becomes bellow 65°C, the exhaust motor will stop. This motor is D.C. motor.

NOTE: Do not disconnect the power supply from the exhaust motor when it is turned on. Or it may be out of order.

12. ANTENNA MOTORS

The upper and lower antenna motors drive antennas to radiate the microwave.

13. EXHAUST FAN

The exhaust fan is located to the rear cover. It sends the air (which is at the top of the oven cavity) out of the oven. This motor is D.C. motor.

14. ANTENNA SENSOR

The antenna sensors are located to the top and bottom of the oven cavity. And they watch if the antennas are rotating or not.

15. MIROWAVE SENSOR

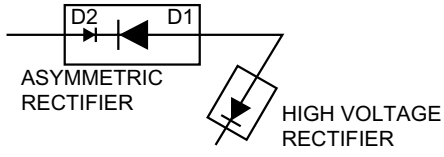
The microwave sensor is located on the top of the oven cavity. And it watch if the microwave is radiated into the oven cavity or not.

16. FUSE 12A (1) (2)

1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazard.
2. The fuse also blows when the asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of high voltage transformer is shorted.

17. H.V. ASYMMETRIC RECTIFIER (1) (2)

The H.V.asymmetric rectifiers (1) (2) are solid state devices that prevent current flow is both directions. And they prevent the temperature rise of the high voltage transformers (1) (2) by blowing the fuses 12A (1) (2) when the high voltage rectifiers (1) (2) are shorted. The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV. The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of the blowing the fuse 12A.)



NOTE: The H.V.asymmetric rectifier is assembled with the high voltage rectifier actually.

1. The high voltage rectifier is shorted by some fault when microwave cooking or dual cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.7 KV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the high voltage transformer.
5. The large electric currents beyond 12A flow through the primary winding of the high voltage transformer.
6. The fuse 12A blows by the large electric currents.
7. The power supplying to the high voltage transformer is cut off.

18. OVEN LAMP

The oven cavity light illuminates the interior of the oven so that food being cooked can be examined visually through the door window without having to open the door.

19. NOISE FILTER

The noise filter prevents the radio frequency interference that might flow back in the power circuit.

CHAPTER 6. TROUBLESHOOTING GUIDE

Never touch any part in the circuit with your hand or an uninsulated tool while the power supply is connected.

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the “Test Procedure“ section.

IMPORTANT:

If the oven becomes inoperative because of a blown monitor fuse, check the monitor switches (1), (2), primary interlock relay RY1, door sensing switch and secondary interlock switches (1), (2), before replacing the monitor fuse. If monitor fuse is replaced, the monitor switch (1) and/or (2) must also be replaced. Use part FFSBA033WRKZ as an assembly.

IMPORTANT:

Whenever troubleshooting is performed with the power supply cord disconnected. It may, in some cases, be necessary to connect the power supply cord after the outer case has been removed, in this event,

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge two high voltage capacitors.
4. Disconnect the leads to the primaries of the two power transformers.
5. Ensure that the leads remain isolated from other components and oven chassis by using insulation tape.
6. After that procedure, reconnect the power supply cord.

When the testing is completed

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge two high voltage capacitors.
4. Reconnect the all leads removed from components during testing.
5. Reinstall the outer case (cabinet).
6. Reconnect the power supply cord after the outer case is installed.
7. Run the oven and check all functions.

TEST PROCEDURE		A	B	C	D	E	F	G	H	J	J	J	I	L	K	M	N	P	Q	O			
POSSIBLE CAUSE AND DEFECTIVE PARTS		MAGNETRON (1), (2)	POWER TRANSFORMER (1), (2)	H.V. RECTIFIER ASSEMBLY (1), (2)	HIGH VOLTAGE CAPACITOR (1), (2)	SECONDARY INTERLOCK SWITCH (1), (2)	PRIMARY INTERLOCK SYSTEM	DOOR SENSING SWITCH	MONITOR SWITCH (1), (2)	MONITOR FUSE	MAGNETRON TEMP. FUSE (1), (2)	OVEN TEMPERATURE FUSE	OVEN LAMP OR SOCKET	FAN MOTORS	EXHAUST FAN	EXHAUST MOTOR	FUSE 12A (1), (2)	EXHAUST THERMISTOR	MAGNETRON THERMISTOR	NOISE FILTER	KEY UNITS	POWER UNIT	RELAY UNIT	CONTROL UNIT	SWITCH UNIT.	AIR FLOW BLOCKED	LOOSE WIRING	SHORT IN POWER SUPPLY CORD	NO POWER AT OUTLET	LOW POWER SUPPLY VOLTAGE
CONDITION	PROBLEM																						
OFF CONDITION	Home fuse blows when power cord is plugged into wall receptacle																						●
	Monitor fuse blows when power cord is plugged into wall receptacle.					●	●																●
	" . " does not appear in display when power cord is first plugged into wall receptacle.								●			●								●			●
	Oven lamp does not go on for 1 minute after door is opened.							●												●			
COOKING CONDITION	It seems that the output power is lower or higher than the rated one.	●																					
	Oven lamp and antenna motors do not go on in cook cycle.																						
	Oven goes into a cook cycle but shuts down before and off cooking cycle.									●	●	●			●				●	●			
	Oven does not go into cook cycle when START pad is touched.						●	●											●	●			●
	Low or no power is produced during cooking condition. (The food is heated incompletely or not heated at all.)	●	●	●	●	●	●				●						●						●
	Variable cooking does not operates properly, except HIGH power functions.																		●				
	Fan motor does not operate.													●									
	Exhaust fan does not operate.														●								
	Exhaust motor does not operate.												●										
	Oven doen not go into cook cycle when START pad on the door is touched.						●	●										●					

SPECIFICATION OF ERROR

Outline	Operation when error occurs	Display in operation usually
When a basic performance and the function are ruined	Displaying and heating stop	EE0, EE1, EE2, EE3, EE8
When the dangers of the state of the high temperature and the ignition, etc. are foreseen	Displaying and heating stop	EE7
When you mistake the setting of the heating time	Operation stop	EE9
When neither the power supply nor the environmental condition are proper	Operation stop	EE4, EE6
When informing of the exchange time of parts	Display Only	CC1, CC2, CC3, CC4

Usual error display	Error history display	Content of error	A Magnetron 1and /or 2	B Power transformer 1 & 2	D High voltage capacitor 1 and /or 2	C H.V.rectifier assembly 1 and/or 2	E Secondary interlock switch 1 and/or	F Primary interlock system	I Fuse 12A 1 and/or 2	J Magnetron temp. fuse 1 and/or 2	K Magnetron thermistor 1 and/or 2	L Exhaust thermistor	Fan motors	Exhaust motor	Antenna motor 1 and/or 2	Air flow blocked	High power supply voltage	No load or small load operation	Loose wiring	Exceeding of maxmum cooking time	Burned food	Q Relay unit	O Control unit	R Antenna sensor (1) (Upper)	R Antenna sensor (2) (Lower)	S Microwave sensor
EE1	EE 1	Failer of high voltage circuit 1	●	●	●	●	●		●	●									●			●	●			
EE2	EE 2	Failer of high voltage circuit 2	●	●	●	●	●		●	●									●			●	●			
EE3	EE 3	Failer of high voltage circuit 1&2	●	●	●	●	●	●	●	●									●			●	●			
EE4	EE 4	Too high of input voltage															●					●	●			
EE7	EE 7	Food burned (temp., too high)										●									●		●			
EE8	EE 8	Melted contacts of relays																				●	●			
EE9	EE 9	Over maximum cooking time																		●						
EE8	EE 10	EEPROM error																					●			
EE1	EE 11	Life end of magnetron 1	◎																				●			
EE2	EE 21	Life end of magnetron 2	◎																				●			
EE3	EE 31	Life end of magnetron 1&2	◎																				●			
EE8	EE 81	Life end of relays RY2/RY3																				◎	●			
EE3	EE 83	Over Current error		●																		●	●			
EE0	EE 14	MG1 Cooling Fan lock judge											●						●				●			
EE0	EE 24	MG2 Cooling Fan lock judge											●						●				●			
EE0	EE 44	Exhaust motor lock judge												●					●				●			
EE0	EE 54	Life end of exhaust motor												●									●			
EE0	EE 15	MG1 antenna rotation error													●				●				●	●		
EE0	EE 25	MG2 antenna rotation error													●				●				●		●	
EE0	EE 35	MG1/2 antenna rotation error													●				●				●	●	●	
EE8	EE 16	MG1 thermistor open									●								●				●			
EE8	EE 26	MG2 thermistor open									●								●				●			
EE7	EE 17	MG1 temperature, too high	●										●			●			●				●			
EE7	EE 27	MG2 temperature, too high	●										●			●			●				●			
EE8	EE 18	Magnetron 1	●																●				●			●
EE8	EE 28	Magnetron 2	●																●				●			●
EE8	EE 38	Magnetron 1& 2	●																●				●			●
EE8	EE 29	Exhaust thermistor open/short										●							●				●			
EE6	EE 19	No food																●					●			
EE6	EE 39	small food																●					●			

NOTE: "◎" means that the parts should be replaced when EE11, EE21, EE31 or EE81 is indicated on the display.

Display for maintenance	Error history display	Content of maintenance	Check item	Parts to be replaced
CC1	–	MG1 exchange time information	Using time of MG1	MG1
CC2	–	MG2 exchange time information	Using time of MG2	MG2
CC3	–	Exhaust Fan motor exchange time information	Using time of Exhaust motor	Exhaust motor
CC4	–	T/C unit exchange time information	Using number of times of RY2/RY3	Relay unit

CHAPTER 7. TEST PROCEDURES

[1] A: MAGNETRON ASSEMBLY TEST

1. Disconnect the power supply cord, and then remove outer case and rear cover.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. To test for an open filament, isolate the magnetron from the high voltage circuit. A continuity check across the magnetron filament leads should indicate less than 1 ohm.
5. To test for a shorted magnetron, connect the ohmmeter leads between the magnetron filament leads and chassis ground. This test should indicate an infinite resistance. If there is little or no resistance the magnetron is grounded and must be replaced.
6. Reconnect all leads removed from components during testing.
7. Reinstall the rear cover and the outer case (cabinet).
8. Reconnect the power supply cord after the outer case is installed.
9. Run the oven and check all functions.

1. MICROWAVE OUTPUT POWER

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted).

HIGH VOLTAGES ARE PRESENT DURING THE COOK CYCLE, SO EXTREME CAUTION SHOULD BE OBSERVED.

Power output of the magnetron can be measured by performing a water temperature rise test. This test should only be used if above tests do not indicate a faulty magnetron and there is no defect in the following components or wiring: silicon rectifier, high voltage capacitor and power transformer. This test will require a 16 ounce (453cc) measuring cup and an accurate mercury thermometer or thermocouple type temperature tester. For accurate results, the following procedure must be followed carefully:

1. Fill the measuring cup with 16 oz. (453cc) of tap water and measure the temperature of the water with a thermometer or thermocouple temperature tester. Stir the thermometer or thermocouple through the water until the temperature stabilizes. Record the temperature of the water.
2. Place the cup of water in the oven. Operate oven at 100% Power selecting more than 60 seconds cook time. Allow the water to heat for 60 seconds, measuring with a stop watch, second hand of a watch or the digital read-out countdown.
3. Remove the cup from the oven and again measure the temperature, making sure to stir the thermometer or thermocouple through the water until the maximum temperature is recorded.
4. Subtract the cold water temperature from the hot water temperature. The normal result should be34.2 to 63.4°F(19 to 35.2°C) rise in temperature. If the water temperatures are accurately measured and tested for the required time period the test results will indicate if the magnetron tube has low power output (low rise in water temperature) which would extend cooking time or high power output (high rise in water temperature) which would reduce cooking time. Because cooking time can be adjusted to compensate for power output, the magnetron tube assembly should be replaced only if the water temperature rise test indicates a power output well beyond the normal limits. The test is only accurate if the power supply line voltage is 120 volts and the oven cavity is clean.

[2] B: POWER TRANSFORMER TEST

1. Disconnect the power supply cord, and then remove outer case and rear cover.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Disconnect the primary input terminals and measure the resistance of the transformer with an ohmmeter. Check for continuity of the coils with an ohmmeter. On the R x 1 scale, the resistance of the primary coil should be less than 1 ohm and the resistance of the high voltage coil should be approximately 88 ohms; the resistance of the filament coil should be less than 1 ohm.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the outer case is installed.
8. Run the oven and check all functions.

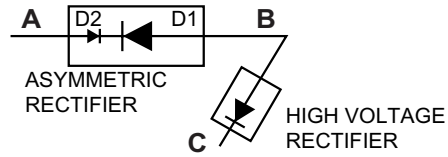
(HIGH VOLTAGES ARE PRESENT AT THE HIGH VOLTAGE TERMINAL, SO DO NOT ATTEMPT TO MEASURE THE FILAMENT AND HIGH VOLTAGE.)

[3] C: HIGH VOLTAGE RECTIFIER (1) AND/OR (2) TEST

1. HIGH VOLTAGE RECTIFIERFTEST

1. Disconnect the power supply cord, and then remove the outer case and the rear cover.
2. Open the door and block it open.
3. Discharge two high voltage capacitors.
4. Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100k ohms in the other direction.

5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.



2. ASYMMETRIC RECTIFIER TEST

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge two high voltage capacitors.
4. Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric rectifier can be tested using an ohmmeter set to its highest range across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both directions then the asymmetric rectifier is good. If the asymmetric rectifier is shorted in either direction, then the asymmetric rectifier is faulty and must be replaced with high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the high voltage transformer is shorted.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

NOTE: Be sure to use an ohmmeter that will supply a forward bias voltage of more than 6.3 volts.

[4] D: HIGH VOLTAGE CAPACITOR (1) AND/OR (2) TEST

1. Disconnect the power supply cord, and then remove outer case and rear cover.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. If the capacitor is open, no high voltage will be available to the magnetron. Disconnect input leads and check for short or open between the terminals using an ohmmeter.

   Checking with a high ohm scale, if the high voltage capacitor is normal, the meter will indicate continuity for a short time and should indicate an open circuit once the capacitor is charged. If the above is not the case, check the capacitor with an ohmmeter to see if it is shorted between either of the terminals and case. If it is shorted, replace the capacitor.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

[5] E: SECONDARY INTERLOCK SWITCH (1) AND/OR (2) TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the secondary interlock switch.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

[6] F: PRIMARY INTERLOCK SYSTEM TEST

1. DOOR SENSING SWITCH

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the door sensing switch.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).

7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

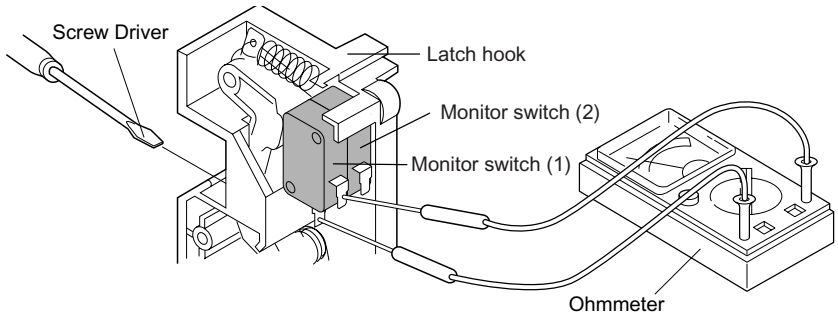
NOTE: If the door sensing switch contacts fail in the open position and the door is closed, the blower motor, stirrer motors and oven light will be activated by RY1.

2. PRIMARY INTERLOCK RELAY RY1

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Disconnect two (2) wire leads from the male tab terminals of the Primary Interlock Relay RY1. Check the state of the relay contacts using a ohmmeter. The relay contacts should be open. If the relay contacts are closed, replace the circuit board entirely or the relay itself.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

[7] G: MONITOR SWITCH (1) AND/OR (2) TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Before performing this test, make sure that the secondary interlock switches (1), (2) and the primary interlock relay RY1 are operating properly, according to the above Switch Test Procedure. Disconnect the wire lead from the monitor switches (1), (2) (COM) terminals. Check the monitor switches (1), (2) operation by using the ohmmeter as follows. When the door is open, the meter should indicate a closed circuit. When the monitor switch actuator is pushed by a screw driver through the upper latch hole on the front plate of the oven cavity with the door opened (in this condition the plunger of the monitor switch is pushed in), the meter should indicate an open circuit. If improper operation is indicated, the switch may be defective. After testing the monitor switches, reconnect the wire lead to the monitor switch (COM) terminals and check the continuity of the monitor circuit.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.



[8] H: BLOWN MINITOR FUSE TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. If the monitor fuse is blown when the door is opened, check the primary interlock relay RY1, secondary interlock switches (1), (2) and monitor switches (1), (2) according to the “TEST PROCEDURE” for those switches before replacing the blown monitor fuse.

CAUTION: CAUTION: BEFORE REPLACING A BLOWN MONITOR FUSE, TEST THE PRIMARY INTERLOCK RELAY, SECONDARY INTERLOCK SWITCHES, DOOR SENSING SWITCH AND MONITOR SWITCHES FOR PROPER OPERATION.

If the monitor fuse is blown by improper switch operation, the monitor fuse and monitor switch must be replaced with “monitor fuse and monitor switch assembly” part number FFS-BA033WRKZ, even if the monitor switch operates normally. The monitor fuse and monitor switch assembly is comprised of a 20 ampere fuse and switch.

5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

[9] I: FUSE 12A (1) (2) TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. If the fuse is blown, check the magnetron, high voltage capacitor, high voltage rectifier assembly, according to the “TEST PROCEDURE” before replacing the blown fuse. Then replace the fuse.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

[10] J: TEMPERATURE FUSE TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. A continuity check across the temperature fuse terminals should indicate a closed circuit unless the temperature of the temperature fuse reaches specified temperature as shown below.

	Open temperature	Close temperature	Display or Condition	Check point
Magnetron temperature fuse (1)	150°C	Non resetable type	EE1	Magnetron (1) Failure: Test magnetron (1) and fan motor.
Magnetron temperature fuse (2)			EE2	Magnetron (2) Failure: Test magnetron (2) and fan motor.
Magnetron temperature fuse (1), (2)			EE3	Magnetron (1), (2) Failure: Test magnetron (1), (2). Check fan motor and ventilation opening.
Oven temperature fuse	120°C	Non resetable type	Oven shut off	Food has been burned in oven. Temperature of oven inside is very high.

5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

CAUTION: IF THE TEMPERATURE FUSE INDICATES AN OPEN CIRCUIT AT ROOM TEMPERATURE, REPLACE TEMPERATURE FUSE.

[11] K: MAGNETRON THERMISTOR TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Disconnect the connector of the magnetron thermistor from the harness. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to the connector of the thermistor.

Room temperature	Resistance
68°F (20°C)	Approx. 750KΩ

   If the meter does not indicate above resistance, replace the thermistor.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.

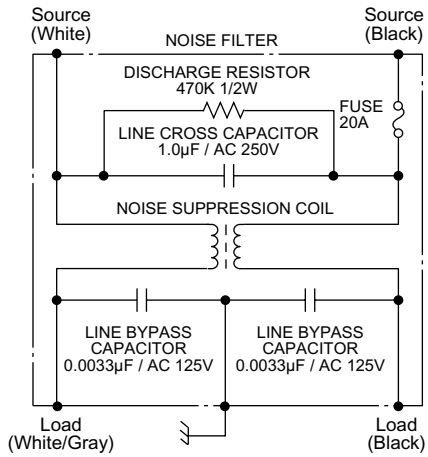
[12] L: EXHAUST THERMISTOR TEST

The exhaust thermistor can be checked by using the Special function (SF-6). Check the exhaust thermistor, referring to the pages of the Exhaust thermistor check (SF-6).

If the display shows “OH”, the exhaust thermistor is normal. If the display shows “no”, the exhaust thermistor is abnormal and it should be replaced.

[13] M: NOISE FILTER TEST

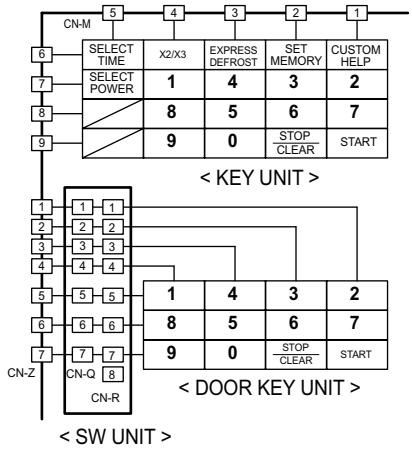
1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Disconnect the lead wires from the terminal the noise filter. Using an ohmmeter, check between the terminals as described in the following table. If incorrect reading are obtained, replace the noise filter.
5. Reconnect all leads removed from components during testing.
6. Reinstall the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord after the rear cover and the outer case are installed.
8. Run the oven and check all functions.



MEASURING POINT	INDICATION OF OHMMETER
Between source terminals	Approx. 470KΩ
Between source (Black) and load (Black) terminals	Short circuit.
Between source (White) and load (White/Gray) terminals	Short circuit.

[14] N: KEY UNIT TEST

1. Disconnect the power supply cord, and then remove outer case and rear cabinet.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Check Key unit ribbon connection before replacement.
5. If key unit ribbon connection is normal, carry out the following procedures.
6. Re-install the rear cover and the outer case (cabinet).
7. Reconnect the power supply cord.
8. The following symptoms indicate a defective key unit.
   1) When touching the pads, a certain pad produces no signal at all.
   2) When touching a number pad, two figures or more are displayed.
   3) When touching the pads, sometimes a pad produces no signal.
9. When you can not judge if the key unit is normal or not by using the item 8 above, carry out following test procedures.
   1) Disconnect the power supply cord, and then remove outer case and rear cover.
   2) Open the door and block it open.
   3) Discharge two high voltage capacitors.
   4) Disconnect the leads to the primary of the power transformer.
   5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
   6) Reconnect the power supply cord.
   7) If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon cable is making good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the door sensing switch (stop switch) is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the door sensing switch connector). Use the Key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad making momentary contact. If the control unit responds by clearing with a beep the key unit is faulty and must be replaced. If the control unit does not respond, it is faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.
   8) For the door key unit, check the open/short and/or connection of the switch unit and the harness, too.



10. If the Key unit is defective.
    1) Disconnect the power supply cord, and then remove outer case and rear cover.
    2) Open the door and block it open.
    3) Discharge two high voltage capacitors.
    4) Replace the Key unit.
    5) Reconnect all leads removed from components during testing.
    6) Re-install the rear cover and the outer case (cabinet).

7) Reconnect the power supply cord after the rear cover and the outer case are installed.

8) Run the oven and check all functions.

[15] O: CONTROL UNIT TEST

The following symptoms indicate a defective control unit. Before replacing the control unit, perform the Key units test (Procedure) to determine if control unit is faulty.

Connect the power supply cord. And check for followings.

1. In connection with pads.
   1) When touching the pads, a certain group of pads do not produce a signal.
   2) When touching the pads, no pads produce a signal.
2. In connection with display
   1) At a certain digit, all or some segments do not light up.
   2) At a certain digit, brightness is low.
   3) Only one indicator does not light.
   4) The corresponding segments of all digits do not light up; or they continue to light up.
   5) Wrong figure appears.
   6) A certain group of indicators do not light up.
   7) The figure of all digits flicker.
3. Other possible problems caused by defective control unit.
   1) Buzzer does not sound or continues to sound.
   2) Cooking is not possible.
4. If the protectors F1 and/or F2 on the control unit PWB are open, the control unit is defective. To check, carry out following procedures.
   i) Disconnect the power supply cord, and then remove outer case and rear cover.
   ii) Open the door and block it open.
   iii) Discharge two high voltage capacitors.
   iv) Remove the control unit from the control panel, referring to “CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL”.
   v) Check the continuity of the protectors F1 and F2 on the control unit

[16] P: POWER UNIT TEST

1. Check the out put voltage of power unit at CN21 as follows.
   i) Disconnect the power supply cord, and then remove outer case and rear cover.
   ii) Open the door and block it open.
   iii) Discharge two high voltage capacitors.
   iv) Disconnect the leads to the primary of the power transformer.
   v) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
   vi) Check the voltage between Pin No1 and No2 of CN21.
   vii) The output voltage should be approx. 24V.
   viii) If not so, the power unit is defective.
2. Check the continuity of the fuse F1 and protector F21 on the power unit as follows.
   i) Disconnect the power supply cord, and then remove outer case and rear cover.
   ii) Open the door and block it open.
   iii) Discharge two high voltage capacitors.
   iv) Remove the power unit from the oven, referring to “POWER UNIT REMOVAL”.
   v) Check the continuity of the fuse F1 and the protector F21.
   vi) If they are open, the power unit is defective

[17] Q: RELAY UNIT TEST

1. Disconnect the power supply cord, and then remove outer case and rear cover.
2. Open the door and block it open.
3. Discharge two high voltage capacitors.
4. Remove the relay unit from the oven, referring to “RELAY UNIT REMOVAL”.
5. Check the continuity of the FUSE1 on the relay unit.

1) If it is open, the relay unit is defective.

6. Check the open and /or short of the transformer primary coil on the relay unit.
   1) If it is open and /or short, it is defective.
7. Check the state of the relays contacts RY-1, RY-2 and RY-3 using an ohmmeter.
   1) The relay contacts should be open. If not so, the relay unit is defective.

[18] R: ANTENNA SENSOR TEST

There is no test procedure for the antenna sensor.

When the error history display shows EE15, EE25 or EE35, if the antenna motors, control unit and wiring are normal, the antenna sensor may be defective.

[19] S: MICROWAVE SENSOR TEST

There is no test procedure for the microwave sensor.

When the error history display shows EE18, EE28 or EE38, if the magnetrons, control unit and wiring are normal, the microwave sensor may be defective.

CHAPTER 8. TOUCH CONTROL PANEL ASSEMBLY

[1] SPECIAL FUNCTION FOR SERVICING

This oven has the special functions for servicing as shown in the table 1 ~ 4.

By using the special function, service person can check the using time or the using number of times for the electrical parts. Also service person can check the AC supply voltage and /or set the standard voltage.

When “SF-2” is selected, the display will show the total cooking number of times.

Table 1. Total cooking number of times

Set	Contents (decimal)	Max.	Data clear	New data set
SF-2	Total cooking number of times	9999(x100) times	○	–

The service person can check and /or carry out the contents as shown in the table 2.

Table 2. Special function

contents	key	Display	After plug in
Check, clear and set of using time or number of times	2	SF-2	
Error history	4	SF-4	
Exhaust thermistor check	6	SF-6	Yes
Model name Making date of software	CUSTOM HELP	cd XX (Model) XX XX (Date) XX XX (Time)	

NOTE: The function marked “yes” can be used only after the oven is plugged in again.

1. Check, clear and set of using time or number of times

When the display shows “CC” and the number as shown in the table 3,

1) Before replacing the parts, check the using time or number of times about the parts.

2) If the using time or number of times go over the limit level, replace the defective parts.

3) After replacing the parts, clear the using time or number of times about the parts, referring to the table 4.

Table 3. CC error

Display	Content	Limit level	Action
“CC”, “1.” repeatedly	Magnetron 1 (top)	1250 hour	Display only
“CC”, “2.” repeatedly	Magnetron 2 (bottom)	1250 hour	Display only
“CC”, “3.” repeatedly	Exhaust fan	3000 hour	Display only
“CC”, “4.” repeatedly	Need to change relay unit	MG Relay 200000 times	Display only
“CC”, “1.2.4.” repeatedly	Some maintenance occurs same time Ex. Magnetron 1&2 and relay unit		Display only

The using time or using number of times can be checked or set by using the number pads after “SF-2” is set.

Table 4. Using time or number of times about each part

Contents (decimal)	10 key	Max.	Data clear	New data set
Using time of MG 1 (top)	1	9999 hours	○	○
Using time of MG 2 (bottom)	2	9999 hours	○	○
Using number of times of MG 1 (top) relay	3	999 (x 1000) times	○	–
Using number of times of MG 2 (bottom) relay	4	999 (x 1000) times	○	–
Total cooking time (hour. min.)	5	99 hours 59min.	○	–
Total cooking time (hundred hour)	6	9999 hundred hours	○	–
Using time of exhaust fan	7	9999 hours	○	○

For example: Procedure to check the total cooking number of times (example, 957700 times) and using time (example, 1260 hours) of MG 1 and set 0 hours after MG1 is replaced.

● : no sound ○: 0.1 second sound ◎ : 2.0 second sound ⊗ : (0.06 sec. ON, 0.06 sec. OFF) x 2 beeps

☆: [(0.04 sec. ON, 0.04 sec. OFF) x 3] x 4 beeps □: (0.1 sec. ON, 0.1 sec. OFF) x 10 beeps

Operation	Display	Indicator	Sound
	.		
SELECT POWER	.		●
(within 20 sec.) SET MEMORY	.		●
START	.		●
STOP/CLEAR	SF-		○
	↓		
2	SF2		○
(after 1 sec.)	9577	CHECK	
	(total counter for serviced [x 100])	↓	
	↓		
1	1260	CHECK	○
SELECT TIME	0		○
START	SF-2		⊗
	↓		
STOP/CLEAR	0		

For example: Procedure to check the total cooking number of times (example, 957700 times) and clear it and check using time (example, 1260 hours) of MG 1 and set the using time (example, 1000 hours) of MG1.

Operation	Display	Indicator	Sound
	.		
SELECT POWER	.		●
(within 20 sec.) SET MEMORY	.		●
START	.		●
STOP/CLEAR	SF-		○
	↓		
2	SF2		○
(after 1 sec.)	9577	CHECK	
	(total counter for serviced [x 100])	↓	
SELECT TIME	0		○
START	SF-2		⊗
	↓		
1	1260	CHECK	○
SELECT TIME	0		○
1,0,0,0	1000		○x4
START	SF-2		⊗
	↓		
STOP/CLEAR	0		

2. Error history (SF-4)

You can check the most recent 10 error histories.

For example: Procedure to check the error histories that have been memorized in memory 1, memory 2 and memory 9.

Operation	Display	Indicator	Sound
	.		
SELECT POWER	.		●
(within 20 sec.) SET MEMORY	.		●
START	.		●
STOP/CLEAR	SF-		○
	↓		
4	SF-4		○
	↓		
1 (latest error No.)	#1 EE 1		○
2 (1 time previous error)	EE 6		○
9 (8 times previous error)	EE24		○
#2 SELECT POWER	0		⊗

#1 If there is no error “0" will be displayed.

#2 If you touch SELECT POWER, all history are cleared.

3. Exhaust thermistor check (SF-6)

You can check if the exhaust thermistor works correctly or not by using this function.

For example: In case the exhaust thermistor works correctly (275ml water load is necessary.), the display will show "OH" as follows.

Operation	Display	Indicator	Sound
plug in	.		
(within 20 sec.) SELECT POWER	.		●
SET MEMORY	.		●
(within 20 sec.) START	.		●
STOP/CLEAR	SF-		○
6	SF-6		○
START	5.00 (count down)	ON	○
	OH		◎ or ☆
(after 5 min.)			◎ or ☆
STOP/CLEAR	SF-1		○
STOP/CLEAR	0		○

For example: In case the exhaust thermistor works incorrectly (275ml water load is necessary), the display will show "no" as follows. In that case, the exhaust thermistor should be checked or replaced.

Operation	Display	Indicator	Sound
plug in	.		
(within 20 sec.) SELECT POWER	.		●
SET MEMORY	.		●
(within 20 sec.) START	.		●
STOP/CLEAR	SF-		○
6	SF-6		○
START	5.00 (count down)	ON	○
	no		□
(after 5 min.)			◎ or ☆
STOP/CLEAR	SF-1		○
STOP/CLEAR	0		○

4. CUSTOM HELP

You can check if the correct control unit is installed or not by using this function.

Procedure to check the model name and making date of software.

Operation	Display	Indicator	Sound
plug in	.		
(within 20 sec.) SELECT POWER	.		●
SET MEMORY	.		●
(within 20 sec.) START	.		●
STOP/CLEAR	SF-		○
CUSTOM HELP	#1 cd12 (model name)		○
	XXXX (date)		
	XXXX (time)		
STOP/CLEAR	0		○

#1: The display will show "cd12" means model R-CD1200M.

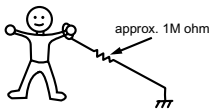
[2] SERVICING FOR BRINTED WIRING BOARDS

1. Precautions for Handling Electronic Components

This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc. and sometimes it is not fully protected by the built-in protection circuit.

In order to protect CMOS LSI.

1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap PW boards containing them in aluminium foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Servicing of Printed Wiring Boards

We describe the procedures to permit servicing of the printed wiring boards of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the printed wiring boards is available either from the power line of the oven itself or from an external power source.

1. **Servicing the printed wiring boards with power supply of the oven:**

CAUTION: THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING AND PRESENTS A HAZARD.

Therefore, before checking the performance of the printed wiring boards,

1) Disconnect the power supply cord and then remove outer case and rear cover.
2) Open the door and block it open.
3) Discharge two high voltage capacitors.
4) Disconnect the leads to the primary of the two power transformers.
5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
6) After that procedure, re-connect the power supply cord.

After checking the performance of the printed wiring boards,

1) Disconnect the power supply cord.
2) Open the door and block it open.
3) Re-connect the leads to the primary of the two power transformers.
4) Re-install the rear cover and the outer case (cabinet).
5) Re-connect the power supply cord after the rear cover and the outer case is installed.
6) Run the oven and check all functions.
   a) On some models, the power supply cord between the printed wiring boards and the oven itself is so short that the they can't be separated. For those models, check and repair all the printed wiring boards (sensor-related ones included) of the printed wiring boards while keeping it connected to the oven.
   b) On some models, the power supply cord between the printed wiring boards and the oven proper is long enough that they may be separated from each other. For those models, it is possible to check and repair the controls of the printed wiring boards while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the printed wiring boards with a jumper, which activates an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the printed wiring boards, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

2. **Servicing the printed wiring boards with power supply from an external power source:**

Disconnect the printed wiring boards completely from the oven proper, and short both ends of the door sensing switch (on PWB) of the printed wiring boards, which activates an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the printed wiring boards, then it is possible to check and repair the controls of the printed wiring boards it is also possible to check the sensor-related controls of the printed wiring boards by using the dummy resistor(s).

3. Servicing Tools

Tools required to service the printed wiring boards assembly.

1) Soldering iron: 60W

   (It is recommended to use a soldering iron with a grounding terminal.)
2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
3) Others: Hand tools

4. Other Precautions

1) Before turning on the power source of the printed wiring boards, remove the aluminium foil applied for preventing static electricity.
2) Connect the connector of the key unit to the printed wiring boards being sure that the lead wires are not twisted.
3) After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
5) Be sure to use specified components where high precision is required.

CHAPTER 9. PRECAUTIONS FOR USING LEAD-FREE SOLDER

Employing lead-free solder

The “Main PWB” of this model employs lead-free solder. This is indicated by the “LF” symbol printed on the PWB and in the service manual. The suffix letter indicates the alloy type of the solder.

Example:

Indicates lead-free solder of tin, silver and copper

Using lead-free wire solder

When repairing a PWB with the “LF” symbol, only lead-free solder should be used. (Using normal tin/lead alloy solder may result in cold soldered joints and damage to printed patterns.)

As the melting point of lead-free solder is approximately 40°C higher than tin/lead alloy solder, it is recommend that a dedicated bit is used, and that the iron temperature is adjusted accordingly.

Soldering

As the melting point of lead-free solder (Sn-Ag-Cu) is higher and has poorer wet ability, (flow), to prevent damage to the land of the PWB, extreme care should be taken not to leave the bit in contact with the PWB for an extended period of time. Remove the bit as soon as a good flow is achieved. The high content of tin in lead free solder will cause premature corrosion of the bit. To reduce wear on the bit, reduce the temperature or turn off the iron when it is not required.

Leaving different types of solder on the bit will cause contamination of the different alloys, which will alter their characteristics, making good soldering more difficult. It will be necessary to clean and replace bits more often when using lead-free solder. To reduce bit wear, care should be taken to clean the bit thoroughly after each use.

CHAPTER 10. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

[1] WARNINGS

WARNING AGAINST HIGH VOLTAGE:

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in severe, possibly fatal, electric shock.
(Example)
High Voltage Capacitor, Power Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage Harness etc..

WARNING: **Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.**

1. Disconnect the power supply cord.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then pull the door handle lever with the other, this causes the latch leads to rise, it is then possible to hear a "click" as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.
Do not operate the oven if any of the following conditions exist;
1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:
1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

WARNING FOR WIRING

To prevent an electric shock, take the following precautions.

1. Before wiring,
   1) Disconnect the power supply cord.
   2) Open the door block it open.
   3) Discharge the two high voltage capacitor and wait for 60 seconds.
2. Don't let the wire leads touch to the following parts;
   1) High voltage parts:
      Magnetron, High voltage transformer, High voltage capacitor, High voltage rectifier assembly and High voltage wire.
   2) Hot parts:
      Oven lamp, Magnetron, High voltage transformer and Oven cavity.
   3) Sharp edge:
      Bottom plate, Oven cavity, Waveguide flange Chassis support and other metallic plate.
   4) Movable parts (to prevent a fault)
      Blower fan blade, Blower fan motor, Switches, Switch levers, Antenna motor and Stirrer antennas.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector until its pin is locked and make sure that the wire leads do not come off even if the wire leads are pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

Please refer to “OVEN PARTS, CABINET PARTS, CONTROL PANEL PARTS, DOOR PARTS”, when carrying out any of the following removal procedures:

[2] OUTER CASE AND REAR COVER REMOVAL

To remove the components, procedure as follows.

1. Disconnect the power supply cord.
2. Remove the eleven (11) screws from the rear and along side the edge of the outer case.

NOTE: Do not lose the support angle at this time.

3. Slide the case back about 1 inch (3 cm) to free it from the oven cavity.
4. Lift entire case from the unit.
5. **DISCHARGE TWO HIGH VOLTAGE CAPACITORS BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.**
6. 6. Now, outer case is free.

To remove rear cover:

7. Remove the four (4) screws holding the magnetron exhaust cover to the rear cover.
8. Remove the magnetron exhaust cover from the rear cover.
9. Disconnect the connector of the fan motor from the connector of harness.

10. Remove the eight (8) screws holding the rear cover and exhaust cover to the bottom plate, power supply cord angle, intake duct and exhaust duct.
11. Remove the rear cover with the fan motor and exhaust cover from the oven cavity.
12. Now, the rear cover with the fan motor and exhaust cover is free.

NOTE: Do not forget to re-connect the wire leads to the exhaust fan when the rear cover and outer case cabinet are reinstalled.

[3] POWER TRANSFORMERS (1) AND/OR (2) REMOVAL

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge two high voltage capacitors.
4. Disconnect the main wire harness from power transformers (1) and/or (2).
5. Disconnect wire leads of power transformers (1) and/or (2) from magnetrons (1) and/or (2).
6. Disconnect wire leads of power transformers (1) and/or (2)from high voltage capacitors (1) and/or (2).
7. Remove two (2) screws holding each power transformer (1) and/or (2) to base plate.
8. Remove the power transformers (1) and/or (2) from base plate.
9. Now, power transformers (1) and/or (2) are free.

[4] MAGNETRONS (1) AND/OR (2) REMOVAL

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge two high voltage capacitors.
4. Disconnect the connector of the magnetron thermistor assembly from the connector of the harness.
5. Remove the magnetron thermistor assembly from magnetrons.
6. Disconnect wire leads from magnetrons (1) and/or (2).
7. Remove the two (2) screws holding the bottom cover to the bottom plate assembly.
8. Remove the bottom cover from the bottom plate assembly.
9. Remove the four (4) screws holding each magnetron (1) and/or (2) to upper and/or lower waveguide. When removing the screws, hold the magnetron to prevent it from falling.
10. Remove the magnetrons (1) and/or (2) from upper and/or lower waveguide with care so magnetron antenna is not hit by any metal object around antenna.
11. Remove the two (2) screws holding the partition plate S to each magnetron (1) and/or (2).
12. Remove the two (2) partition plate S from each magnetron (1) and/or (2).
13. Now, the magnetrons (1) and/or (2) are free.

CAUTION: WHEN REPLACING MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND MOUNTING SCREWS ARE TIGHTENED SECURELY.

[5] MAGNETRON THERMISTOR ASSEMBLY REPLACEMENT

1. REMOVAL

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge two high voltage capacitors.
4. Disconnect the connector of the magnetron thermistor assembly from the capacitor of the harness.
5. Remove the snap band of magnetron thermistor assembly from the hole of the partition cover by pulling out.
6. Remove the magnetron thermistor assembly from the two (2) magnetrons.
7. Now, the magnetron thermistor assembly is free.

2. REINSTALLATION

1. Insert the magnetron thermistor assembly to the magnetron as shown in Figure C-1 and push it until the thermistor assembly stops.
   i) The tabs of the magnetron thermistor assembly should be inserted between the 2nd. fin and 3rd. fin.
   ii) The thermistor should be inserted between the 1st. fin and 2nd. fin.
   iii) And also the thermistor should be inserted center of the right and left walls of the magnetron.
2. Re-install the rear cover and outer case cabinet to the oven by reversing the procedures of “OUTER CASE AND REAR COVER REMOVAL”.

NOTE: Do not forget to re-connect the wire leads to the fan motor.

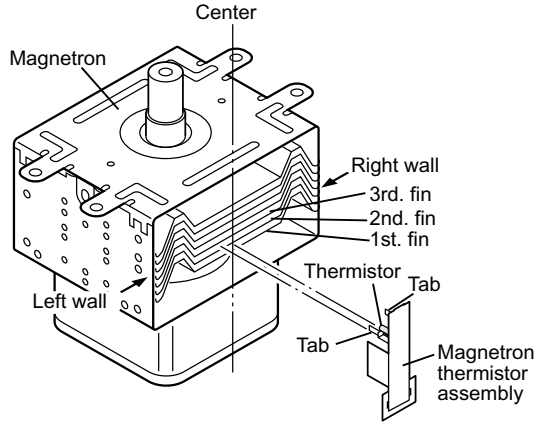


Figure C-1. Magnetron thermistor installation

[6] HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY REMOVAL

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.

3. Discharge two high voltage capacitors.
4. Remove the two (2) screws holding the capacitor unit angle to the intake duct assembly or the exhaust duct assembly.
5. Remove one (1) screw holding the capacitor band to capacitor unit angle.
6. Remove one (1) screw holding ground side terminals of high voltage rectifier assembly to the capacitor band.
7. Remove the capacitor band from the high voltage capacitor.
8. Disconnect all wire leads from the high voltage capacitor.
9. Now, the capacitor (1) or (2) and the high voltage rectifier assembly are free.

CAUTION: 1) DISCHARGE THE TWO HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

2) DO NOT REPLACE ONLY THE HIGH VOLTAGE RECTIFIER. IF IT IS DEFECTIVE, REPLACE THE HIGH VOLTAGE RECTIFIER ASSEMBLY.

3) WHEN REPLACING THE HIGH VOLTAGE RECTIFIER ASSEMBLY AND THE HIGH VOLTAGE CAPACITOR, THE GROUND SIDE TERMINAL OF THE HIGH VOLTAGE RECTIFIER MUST BE SECURED FIRMLY WITH A GROUNDING SCREW.

[7] POWER SUPPLY CORD REPLACEMENT

1. REMOVAL

1. Disconnect the power supply cord and then remove the outer case and the rear cover referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Remove the one (1) screw holding the grounding wire of the power supply cord to the oven cavity.
5. Disconnect the wire leads of the power supply cord from the noise filter.
6. Remove the one (1) screw holding the power supply cord angle to the capacitor unit angle.
7. Remove the power supply cord angle with the power supply cord from the capacitor unit angle.
8. Nip the cord bushing with the bushing pliers and release it from the power supply cord angle.
9. Remove the cord bushing with the power supply cord from the power supply cord angle.
10. Remove the cord bushing from the power supply cord.
11. Now, the power supply cord is free.

2. INSTALLATION

1. Install the cord bushing to the power supply cord so that the small line on the power supply cord surface comes to the end of the cord bushing as shown in the.Figure C-2.
2. Install the cord bushing (with the power supply cord) into the hole of the power supply cord angle with the bushing pliers.
3. Reinstall the power supply cord angle to the capacitor unit angle with the one (1) screw.
4. Install the grounding wire of the power supply cord to the oven cavity with the one (1) screw.
5. Connect the black wire lead of the power supply cord to the source side upper terminal of the noise filter.
6. Connect the white wire lead of the power supply cord to the source side lower terminal of the noise filter.
7. Reinstall the rear cover, the magnetron exhaust cover and the outer case cabinet and check that the oven is operating properly.

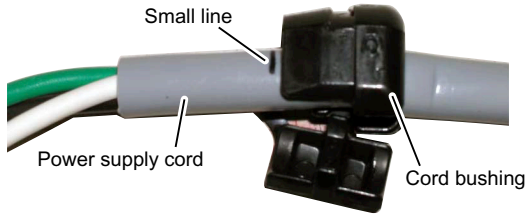


Figure C-2(a) Cord bushing position

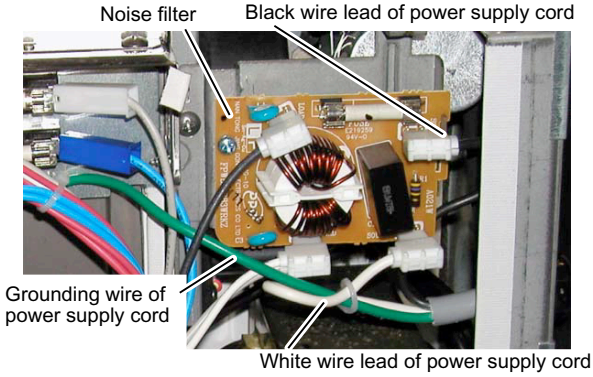

Noise filter
Black wire lead of power supply cord
Grounding wire of power supply cord
White wire lead of power supply cord

Figure C-2(b) Wiring to the noise filter

[8] HOW TO RELEASE THE POSITIVE LOCK CONNECTOR.

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Push the lever of positive lock® connector, pull down the connector from terminal.
5. Now, the connector is free.

CAUTION: THE POSITIVE LOCKR TERMINAL CAN NOT BE REMOVED BYJUST PULLING ON IT. THE LOCK LEVER MUST BE RELEASED TO REMOVE THE CONNECTOR FROM THE TERMINAL.

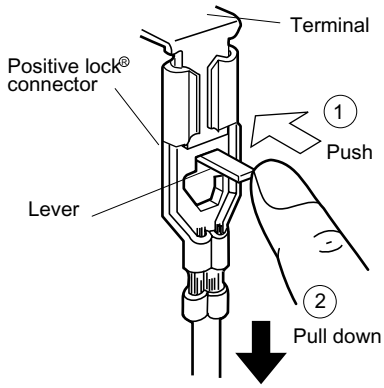


Figure C-3. How to release the positive lock® connector

[9] EXHAUST FAN REMOVAL

1. Disconnect the power supply cord and then remove the outer case and the rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Make sure that the connector of the exhaust fan has been disconnected from the wire harness.
5. Remove the four (4) screws and the two (2) nuts holding the exhaust fan.
6. Now, the exhaust fan is free.

[10] FAN MOTORS REMOVAL

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge two high voltage capacitors.
4. Disconnect the connector of the fan motor from the connector of the wire harness.
5. Remove the three (3) screws holding the fan motor to the motor fixing angle and magnetron cool duct A.
6. Release the wire leads of the fan motor from the wire holder.
7. Remove the fan motor from the oven cavity.
8. Now, the fan motor is free.

[11] ANTENNA MOTORS (UPPER AND LOWER) REMOVAL

1. UPPER

1. Disconnect the power supply cord and then remove outer case and rear cover, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge two high voltage capacitors.
4. Disconnect the wire leads from the antenna motor (upper).
5. Remove the one (1) screw holding the antenna motor (upper) to the oven cavity.
6. Turn and lift up the antenna motor (upper).
7. Now, the antenna motor (upper) is free.

2. LOWER

1. Disconnect the power supply coed.
2. Remove the two (2) screws holding the motor protect cover to the bottom plate assembly.
3. Remove the motor protect cover from the bottom plate assembly.
4. Disconnect the wire leads from the antenna motor (lower).
5. Remove the one (1) screw holding the antenna motor (Lower) to the oven cavity.
6. Now, the antenna motor (lower) is free.

[12] POWER UNIT REMOVAL

1. Disconnect the power supply cord and then remove the outer case, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Disconnect all wire leads and connectors from the power unit.
5. Remove the four (4) screws holding the power unit to the PWB holder.
6. Now, the power unit is free.

[13] RELAY UNIT REMOVAL

1. Disconnect the power supply cord and then remove the outer case, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Disconnect all wire leads and connectors from the power unit and the relay unit.
5. Remove the four (4) screws holding the PWB holder to the oven cavity top plate and the noise filter angle.
6. Remove the PWB holder with the power unit and the relay unit from the oven cavity.
7. Remove the six (6) screws holding the relay unit to the PWB holder.
8. Remove the relay unit from the PWB holder.
9. Now, the relay unit is free.

NOTE: When the relay unit is replaced, set the standard voltage referring to Special Function pages.

[14] CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL

1. Disconnect the power supply cord and then remove the outer case, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Disconnect all connectors from the control unit.
5. Remove the vinyl tape with a cushion attached to the oven cavity face plate and the control panel case.
6. Remove three (3) screws holding the control panel to the oven cavity face plate.
7. Now the control panel assembly is free.
8. Remove five (5) screws holding the control unit to the panel fixing plate.
9. Remove the CPU protect sheet from the control unit.
10. Now, the control unit is free.

CAUTION: When installing the control unit into the control panel frame:

1) Be careful not to damage any of the components on the control unit.
2) When inserting key units ribbon cable through the frame, ensure it is not pinched or bent.

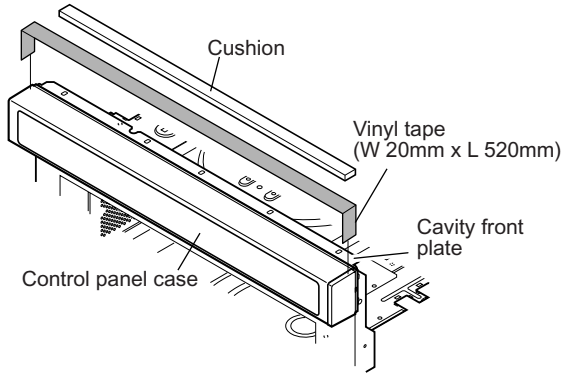
NOTE: 1) Before attaching a new key unit, remove remaining adhesive on the panel fixing plate surfaces completely with a soft cloth soaked in alcohol.

2) When attaching the key unit to the panel fixing plate, adjust the lower edge and left edge of the key unit to the correct position of panel fixing plate.

3) Stick the key unit firmly to the panel fixing plate by rubbing with soft cloth to prevent scratching.

4) When the control unit is replaced, set the standard voltage referring to Special function pages.

5) Attach the vinyl tape and the cushion to the oven cavity face plate and the control panel case after the control panel assembly is installed.



[15] DOOR SENSING SWITCH/SECONDARY INTERLOCK SWITCHES (1), (2) AND MONITOR SWITCHES (1), (2) REPLACEMENT

1. REMOVAL

1. Disconnect the power supply cord and then remove the outer case, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Disconnect all wire leads from the all switches.
5. Remove two (2) screws holding latch hook to oven flange.
6. Remove latch hook assembly from oven flange.
7. Remove the switch(es) in accordance with following procedure.

DOOR SENSING SWITCH

Push the two (2) tabs outward and pull switch forwards to release switch.

MONITOR SWITCHES OR SECONDARY INTERLOCK SWITCHES

Remove one (1) screw and nut holding two switches together to latch hook.

8. Now, switch(es) is now free.

2. REINSTALLATION

1. Re-install the switch(es) in accordance with following procedure.

DOOR SENSING SWITCH

Mount the door sensing switch in the lower position of latch hook.

MONITOR SWITCHES

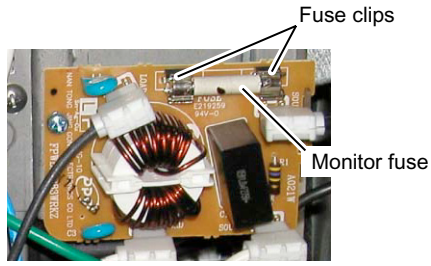
1) Mount the two (2) switches side by side in the top position of the latch hook.

2) Fasten both switches together to latch hook with one (1) screw and nut.

NOTE: for Monitor switch and Fuse replacement

1) .Monitor switch and fuse should be replaced as an assembly.

2) When the monitor fuse is installed to the noise filter, make sure the fuse is held with the fuse clips certainly.



SECONDARY INTERLOCK SWITCHES

1) Mount the two (2) switches side by side in the middle position of the latch hook.

2) Fasten both switches together to latch hook with one (1) screw and nut.

2. Re-install latch hook assembly and fasten it to oven flange with two (2) screws.
3. Re-connect all wire leads to all switches, referring to pictorial diagram. Be careful to ensure proper connection of the wire leads.
4. Make sure that the monitor switches (1), (2) and all other switches are operating properly. And check continuity of the monitor circuit. Refer to chapter “Test Procedure” and Adjustment procedure.

[16] DOOR SENSING SWITCH/SECONDARY INTERLOCK SWITCHES (1), (2) AND MONITOR SWITCHES (1), (2) ADJUSTMENT

1. Adjustment procedure

1. Disconnect the power supply cord and then remove the outer case, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.

If the door sensing switch, secondary interlock switches (1), (2) and monitor switches (1), (2) do not operate properly due to a misadjustment, the following adjustment should be made.

4. Loosen the two (2) screws holding latch hook to the oven cavity front flange.
5. With door closed, adjust latch hook by moving it back and forth, and up and down. In and out play of the door allowed by the upper and lower position of the latch hook should be less than 0.5mm. The vertical position of the latch hook should be adjusted so that the door sensing switch and secondary interlock switches (1), (2) are activated with the door closed. The horizontal position of the latch hook should be adjusted so that the monitor switches (1), (2) are activated with the door closed.
6. Secure the screws with washers firmly.
7. Check the operation of all switches. If all switches have not activated with the door closed, loosen two (2) screws and adjust the latch hook position.

2. After adjustment, check the following.

1. In and out play of door remains less than 0.5mm when in the latched position.
2. The door sensing switch and secondary interlock switches (1), (2) interrupt the circuit before the door can be opened.
3. Monitor switches (1), (2) contacts close when door is opened.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

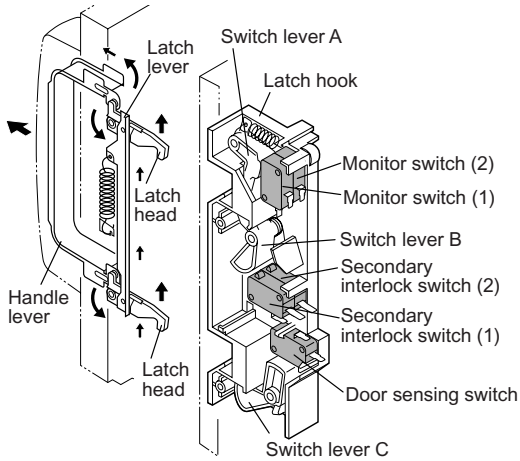


Figure C-4. Latch Switch Adjustments

[17] DOOR REPLACEMENT

1. REMOVAL

1. Disconnect the power supply cord and then remove the outer case, referring to “OUTER CASE AND REAR COVER REMOVAL”.
2. Open the oven door and block it open.
3. Discharge the two high voltage capacitors.
4. Disconnect the harness of the door assembly from the control unit.
5. Remove the two (2) screws holding each of the upper and lower hinges to the oven cavity.
6. Remove door assembly with upper and lower hinges by pulling it forward.
7. Release upper and lower hinges and the hinge cover from door assembly.
8. Now, door assembly is free.

NOTE: When individual parts are replaced, refer to “Door Disassembly”.

2. REINSTALLATION

1. Install the hinge cover to the upper hinge. At this time, the harness of the door assembly should be passed through under the hinge cover.
2. Insert the upper and lower hinges into door hinge pins.
3. Insert the upper and lower hinges with door assembly into rectangular holes of oven cavity front plate.
4. Make sure that the door is parallel with oven face lines (left and upper side line) and door latch heads pass through the latch holes correctly.
5. Fasten upper and lower hinges firmly to oven cavity with two (2) screws on each hinge.

NOTE: After any service to the door;

1) Make sure that door sensing switch, secondary interlock switches (1), (2) and monitor switches (1), (2) are operating properly. (Refer to chapter “Test Procedures”.).
2) An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.

3. DOOR ADJUSTMENT

Door adjustment is performed with the door properly installed and closed and while the oven hinges are loose.

1. Loosen upper and lower hinges with phillips head screw driver.
2. Adjust the door by moving it vertically so that the top of the door is parallel to the bottom of the control panel assembly.
3. Tighten the upper and lower oven hinge screws.

3.1. After adjustment, make sure of the following:

1. Door latch heads smoothly catch the latch hook through the latch holes, and the latch head goes through the center of the latch hole.
2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

NOTE: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from oven cavity during cook cycle.

This function does not require that door be air-tight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around oven door is not abnormal and do not of themselves, indicate a leakage of microwave energy from oven cavity. If such were the case, your oven could not be equipped with a vent, the very purpose of which is to exhaust the vapor-laden air from the oven cavity.

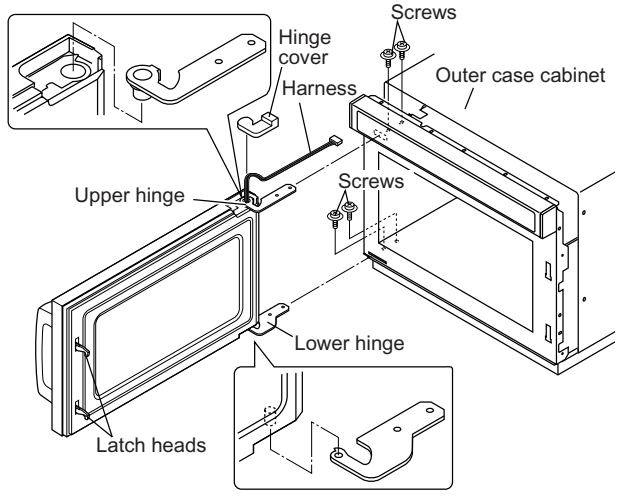


Figure C-5. Door Replacement

[18] DOOR DISASSEMBLY

1. CHOKE COVER REMOVAL

1. Remove the door assembly from oven cavity, referring to “DOOR REMOVAL”.
2. Insert a putty knife (thickness of about 0.5mm) at the three (3) positions in gap between the choke cover and the door panel of the latch heads side as shown in the fig.C-6, to free engaging parts.
3. Push the each four (4) positions of the upper side and lower side of chock cover by your finger as shown in the Fig.C-6, to free engaging parts.
4. Pull the chock cover rightward as shown in the fig.C-6, to free engaging parts.

NOTE: As the choke cover and door panel are engage at 14 places, do not force any particular part.

5. Remove the choke cover carefully. (If choke cover is broken, replace with a new one.)

NOTE: When carrying out any repair to the door, do not bend or warp the slit choke (tabs on the door panel assembly) to prevent microwave leakage.

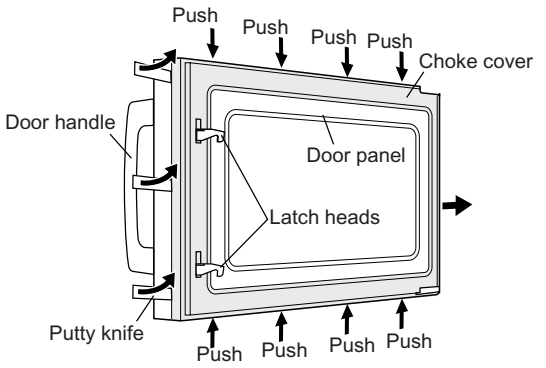


Figure C-6. Choke cover

2. DOOR PANEL REMOVAL

After removing choke cover;

1. Remove the six (6) screws holding the door panel to the door frame.
2. Release the harness from the hole of the door panel.
3. Remove the door panel from the door frame by releasing the six (6) tabs of the door frame.

3. KEY UNIT (IN DOOR ASSEMBLY) REMOVAL

After removing door panel;

1. Remove the five (5) screws holding the key fixing plate to the door frame.
2. Remove the key fixing plate from the door frame.
3. Remove the board cover from the key fixing plate.
4. Disconnect the flat ribbon cable of the key unit from the connector of the switch unit.
5. Remove the connectors installed at the edge of the key unit ribbon cable.
6. Tear the key unit from the key fixing plate.
7. Now, the key unit is free.

NOTE: 1) Before attaching a new key unit, remove remaining adhesive on the key fixing plate surfaces completely with a soft cloth soaked in alcohol.

2) When attaching the key unit to the key fixing plate, adjust the upper edge and left edge of the key unit to the correct position of key fixing plate.

3) Stick the key unit firmly to the key fixing plate by rubbing with soft cloth to prevent scratching.

4. SWITCH UNIT REMOVAL

After removing door panel;

1. Remove the five (5) screws holding the key fixing plate to the door frame.
2. Remove the key fixing plate from the door frame.
3. Remove the board cover from the key fixing plate.
4. Disconnect the flat ribbon cable of the key unit from the connector of the switch unit.
5. Disconnect the harness from the connector of the switch unit.
6. Remove the one (1) screw holding the switch unit to the key fixing plate.
7. Now, the switch unit is free.

5. FRONT DOOR GLASS REMOVAL

After removing door panel;

1. Remove the one (1) screw holding the glass stopper to the door frame.
2. Slide the front door glass leftward (latch heads side) and then slide it upward.
3. Release the upper edge of the front door glass from the tabs of the door frame.
4. Now, the front door glass is free.

6. DOOR HANDLE, DOOR LEVER AND HANDLE COVER REMOVAL

After removing door panel;

1. Remove the latch spring from the latch angle assembly and the latch lever.
2. Remove the one (1) screw holding the latch angle assembly to the door frame.
3. Remove the four (4) screws holding the latch angle assembly to the door handle.
4. Now, the door handle is free.
5. Remove the door lever from the latch heads.
6. Remove the door lever from the handle cover by releasing the tabs.
7. Now, the door lever and the handle cover are free.

7. UPPER AND LOWER LATCH HEADS REMOVAL

After removing door panel;

1. Remove the latch spring from the latch angle assembly and the latch lever.
2. Remove the one (1) screw holding the latch angle assembly to the door frame.
3. Remove the four (4) screws holding the latch angle assembly to the door handle.
4. Now, the door handle is free.
5. Remove the door lever from the latch heads.
6. Remove the two (2) latch heads and the latch lever from the latch angle assembly together.
7. Remove the latch heads from the latch lever.
8. Now, the latch heads are free.

8. DOOR CASE REMOVAL

After removing door panel;

1. Remove the five (5) screws holding the key fixing plate to the door frame.
2. Remove the key fixing plate from the door frame.
3. Remove the front door glass from the door frame, referring to “FRONT DOOR GLASS REMOVAL”.
4. Remove the door handle, the door lever with the handle cover from the door frame, referring to “DOOR HANDLE, DOOR LEVER AND HANDLE COVER REMOVAL”.
5. Remove the one (1) screw holding the latch angle assembly to the door frame.
6. Remove the latch angle assembly with the door latches from the door frame.
7. Bend up all nails of the door case.
8. Remove door case from the door frame.
9. Now, the door case is free

9. NOTE FOR POSITION OF HARNESS AND PIPE

Before the door panel is reinstalled, make sure that the pipe should be positioned at the correct place. And the harness should pass through the holder of the door frame and the pipe, as shown in Fig.C-7.

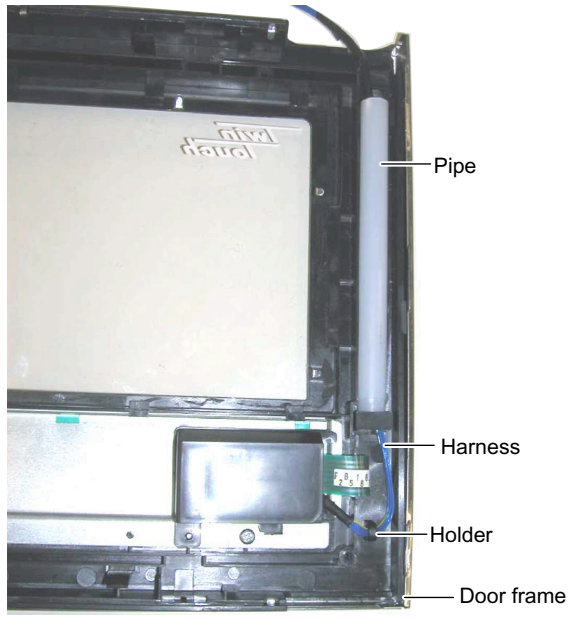
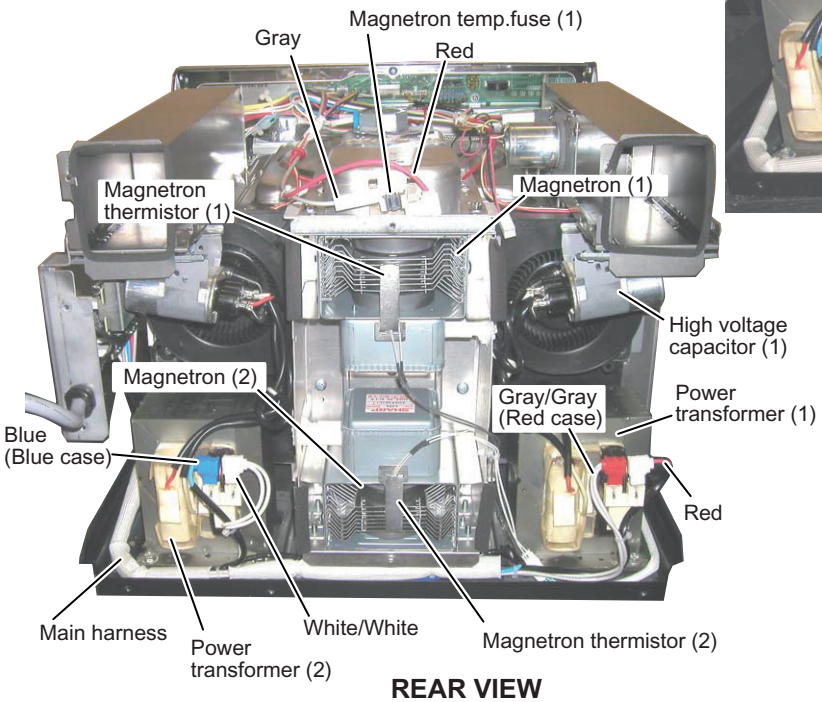


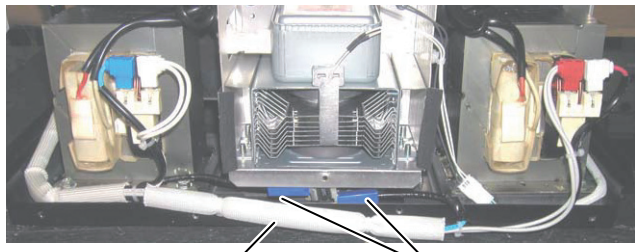
Figure C-7. Inside of door

CHAPTER 11. CIRCUIT DIAGRAMS

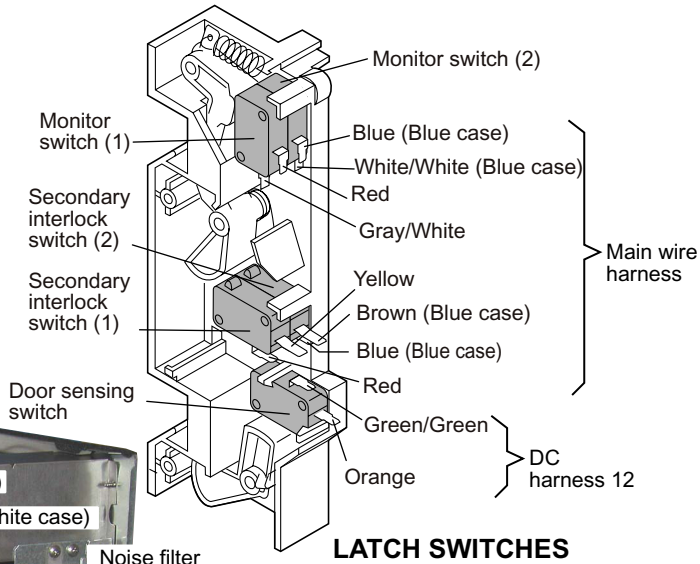
[1] Figure S-1. Pictorial Diagram



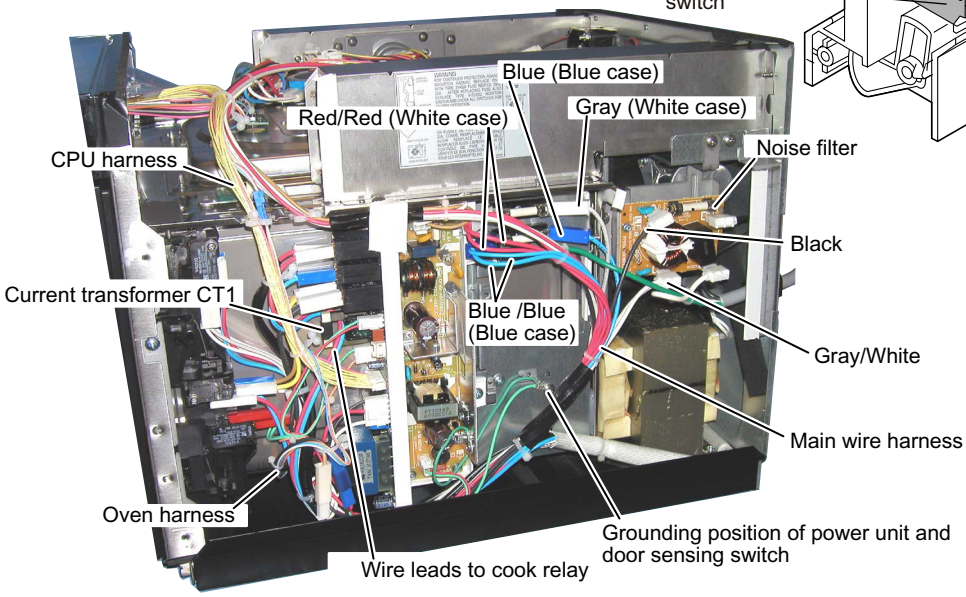
REAR VIEW



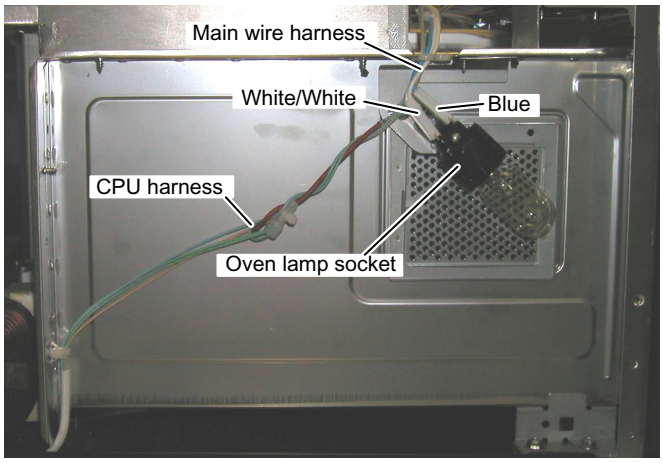
This main wire harness should be back to the original position as shown in Rear view, after the wire leads are connected to the magnetron thermistor (2).



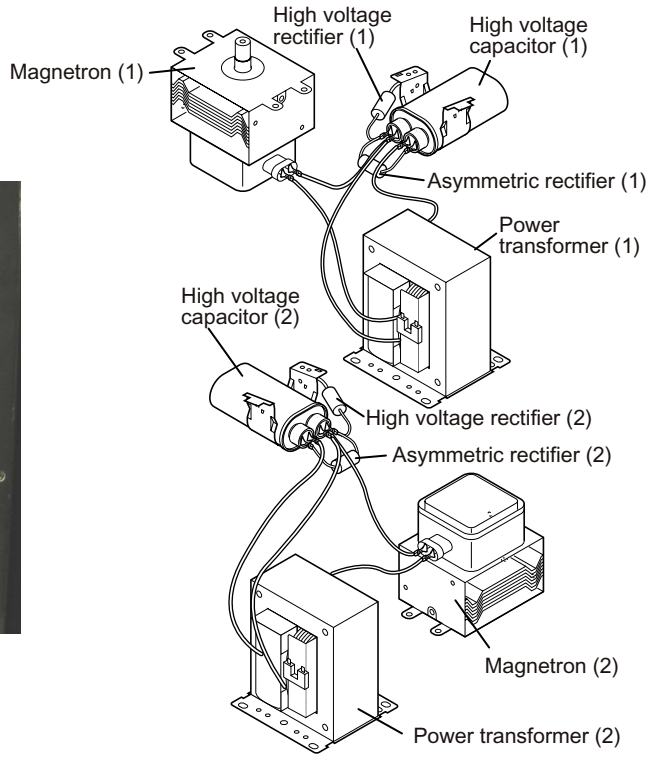
LATCH SWITCHES



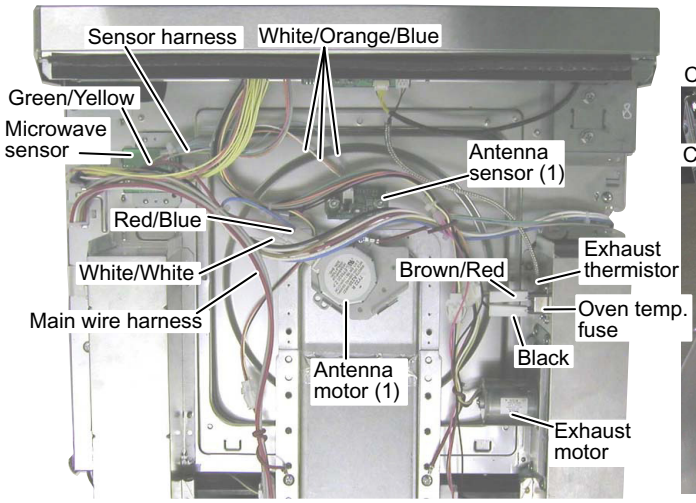
Right side veiw, Grounding position and CT1



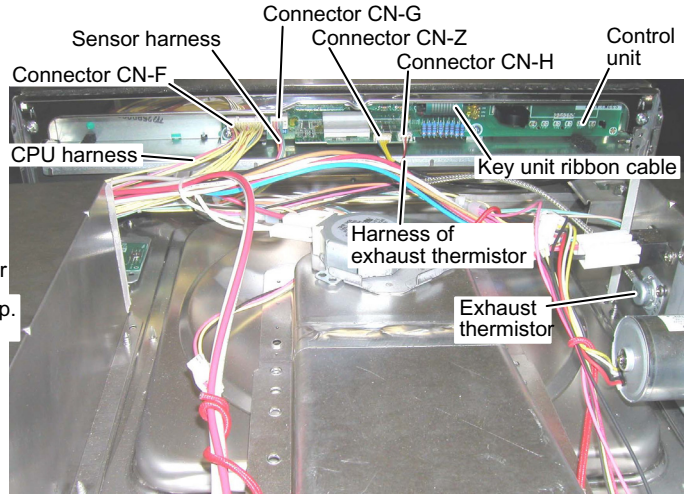
LEFT SIDE VIEW



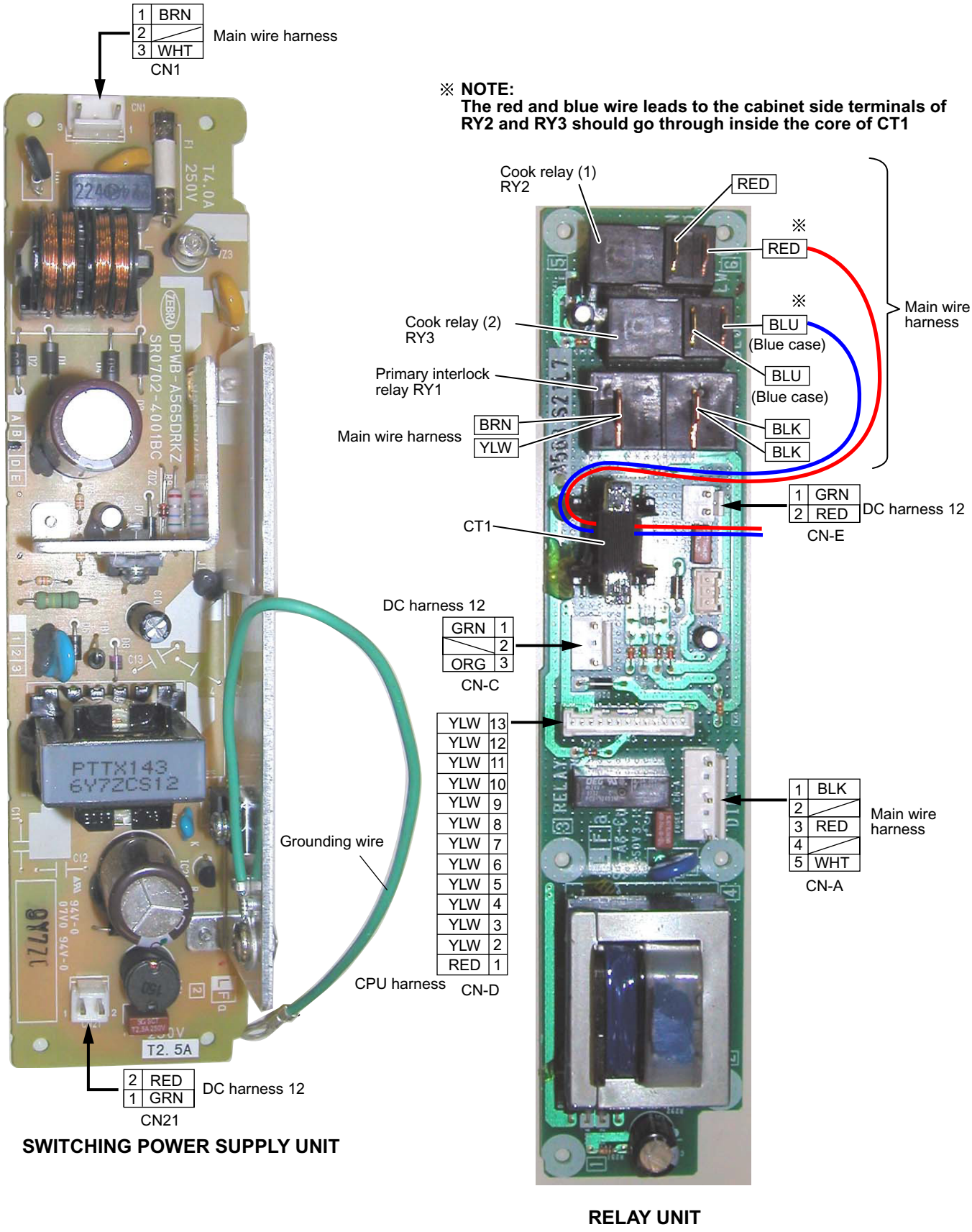
Wiring of high voltage components



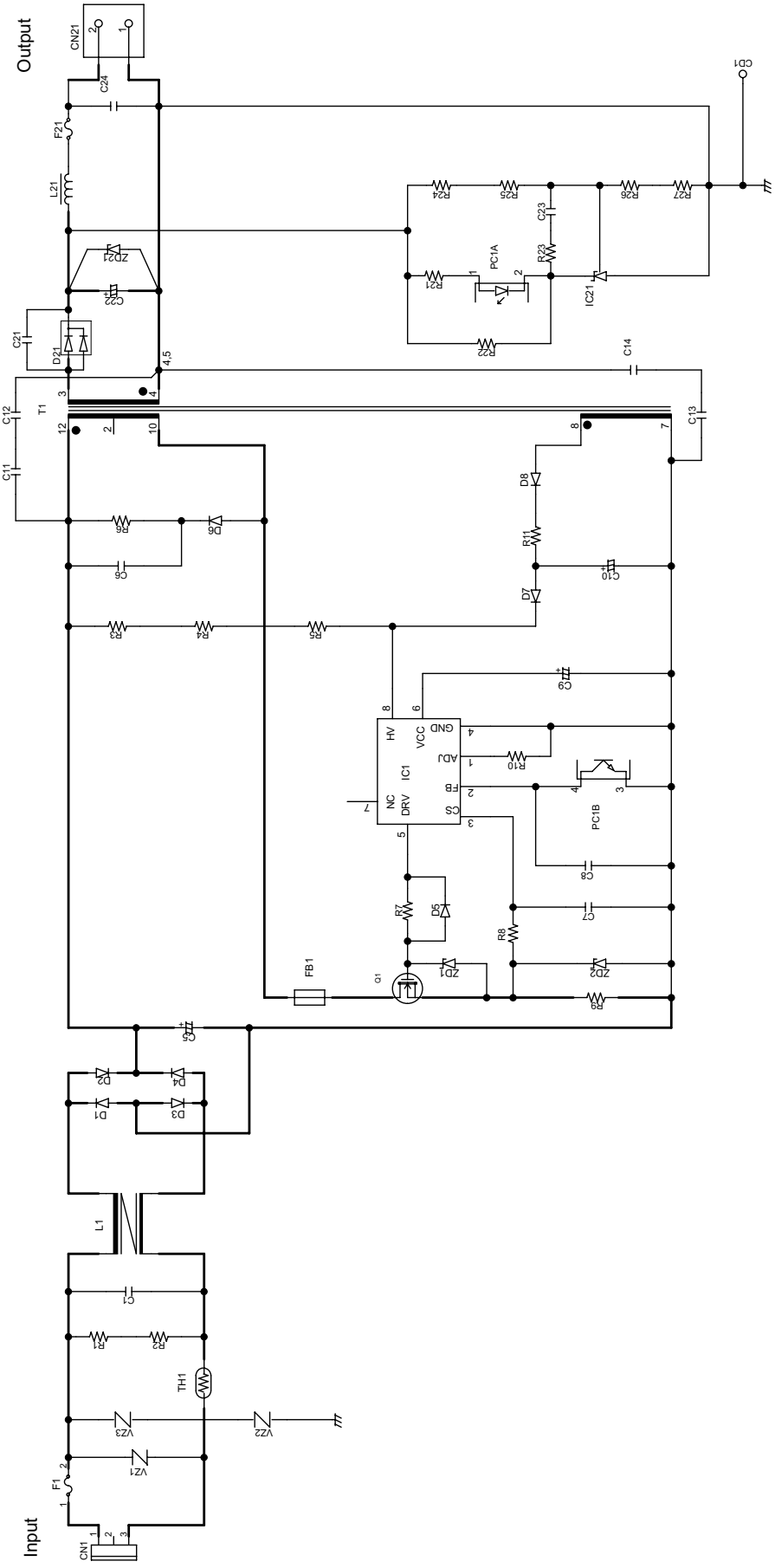
TOP VIEW



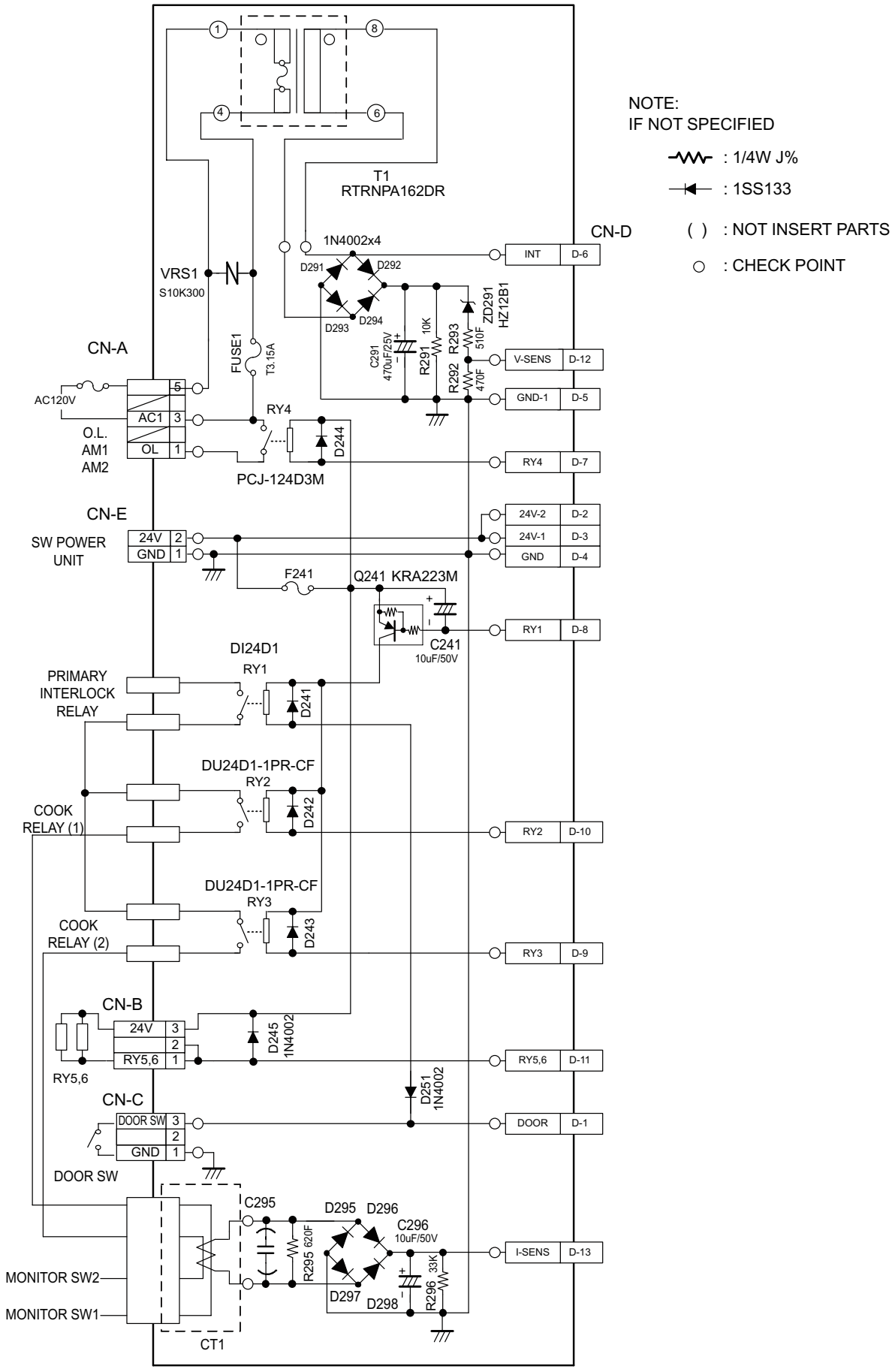
CONTROL UNIT


1 BRN
2
3 WHT
Main wire harness
CN1
※ NOTE:
The red and blue wire leads to the cabinet side terminals of RY2 and RY3 should go through inside the core of CT1
Cook relay (1)
RY2
RED
※
RED
※
BLU
(Blue case)
Main wire harness
Cook relay (2)
RY3
BLU
(Blue case)
Primary interlock relay RY1
Main wire harness
BRN
YLW
BLK
BLK
1 GRN
2 RED
DC harness 12
CN-E
CT1
DC harness 12
GRN 1
2
ORG 3
CN-C
YLW 13
YLW 12
YLW 11
YLW 10
YLW 9
YLW 8
YLW 7
YLW 6
YLW 5
YLW 4
YLW 3
YLW 2
RED 1
CN-D
CPU harness
1 BLK
2
3 RED
4
5 WHT
Main wire harness
CN-A
Grounding wire
T2. 5A
2 RED
1 GRN
DC harness 12
CN21
SWITCHING POWER SUPPLY UNIT
RELAY UNIT

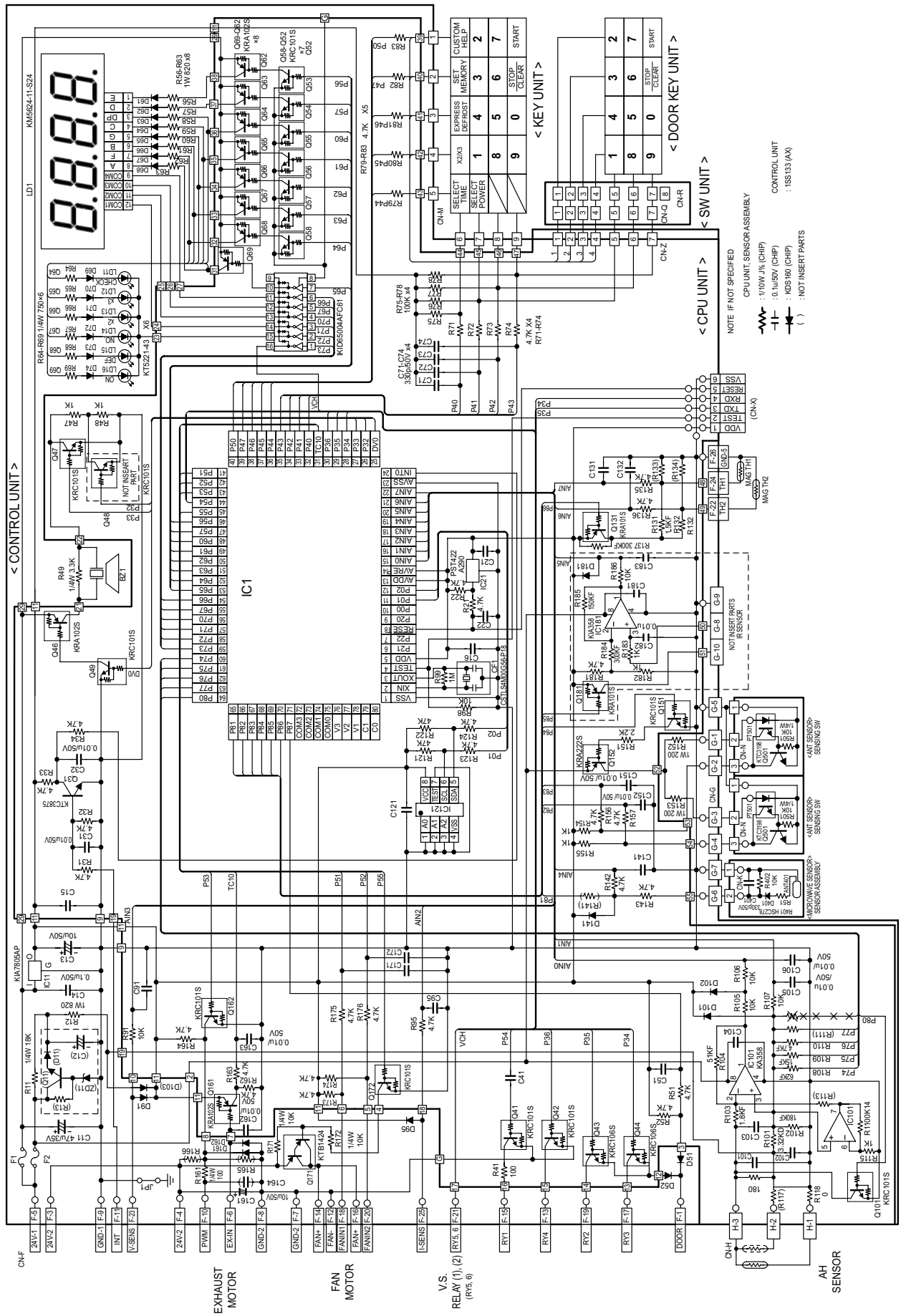
[2] Figure S-2. Switching Power Supply Unit Circuit



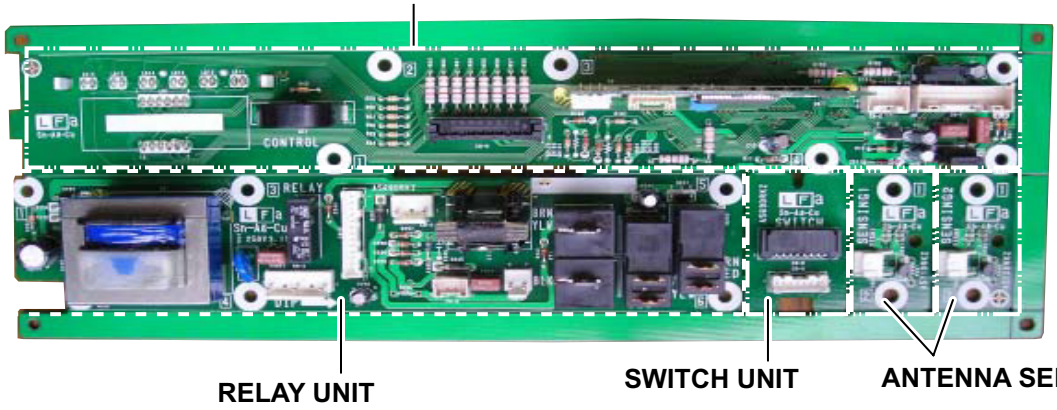
[3] Figure S-3. Relay Unit Circuit

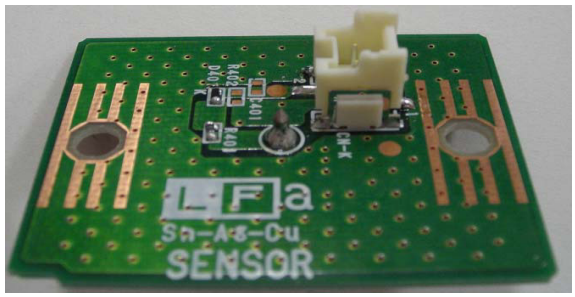


[4] Figure S-4. Control Unit/ Antenna sensor/ Microwave Sensor Circuit

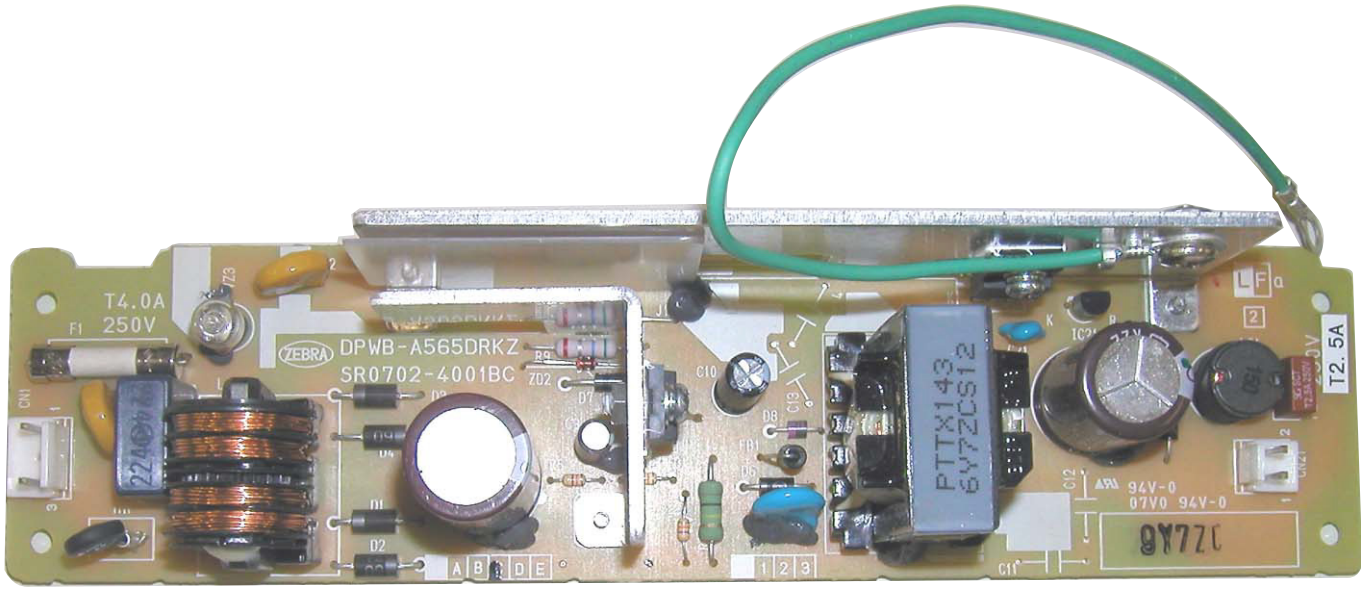


[5] Figure S-5. Printed Wiring Board





MICROWAVE SENSOR



SWITCHING POWER SUPPLY UNIT

SHARP PARTS LIST

COMMERCIAL MICROWAVE OVEN

MODEL R-CD1200M

HOW TO ORDER REPLACEMENT PARTS

To have your order filled promptly and correctly, please furnish the following information.

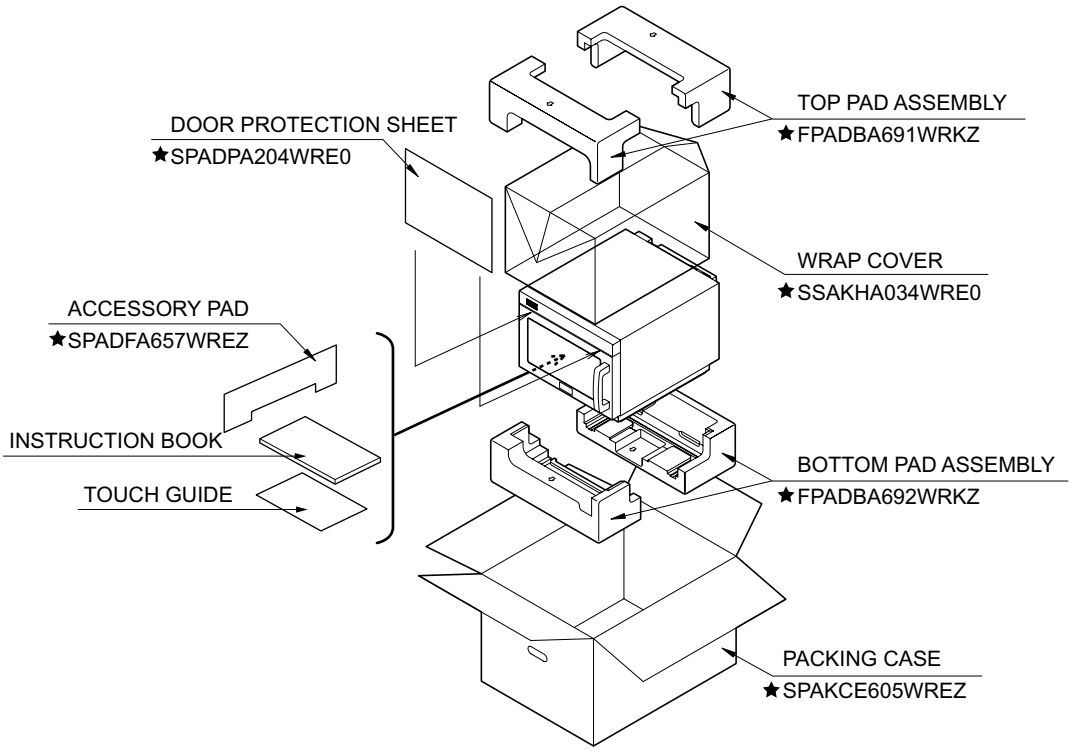
1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

Parts marked "*" may cause undue microwave exposure.
Parts marked " ⚠ " are used in voltage more than 250V.

CONTENTS

[1] OVEN PARTS PARTS

[2] DOOR AND CONTROL PANEL ■ INDEX



SHARP CORPORATION

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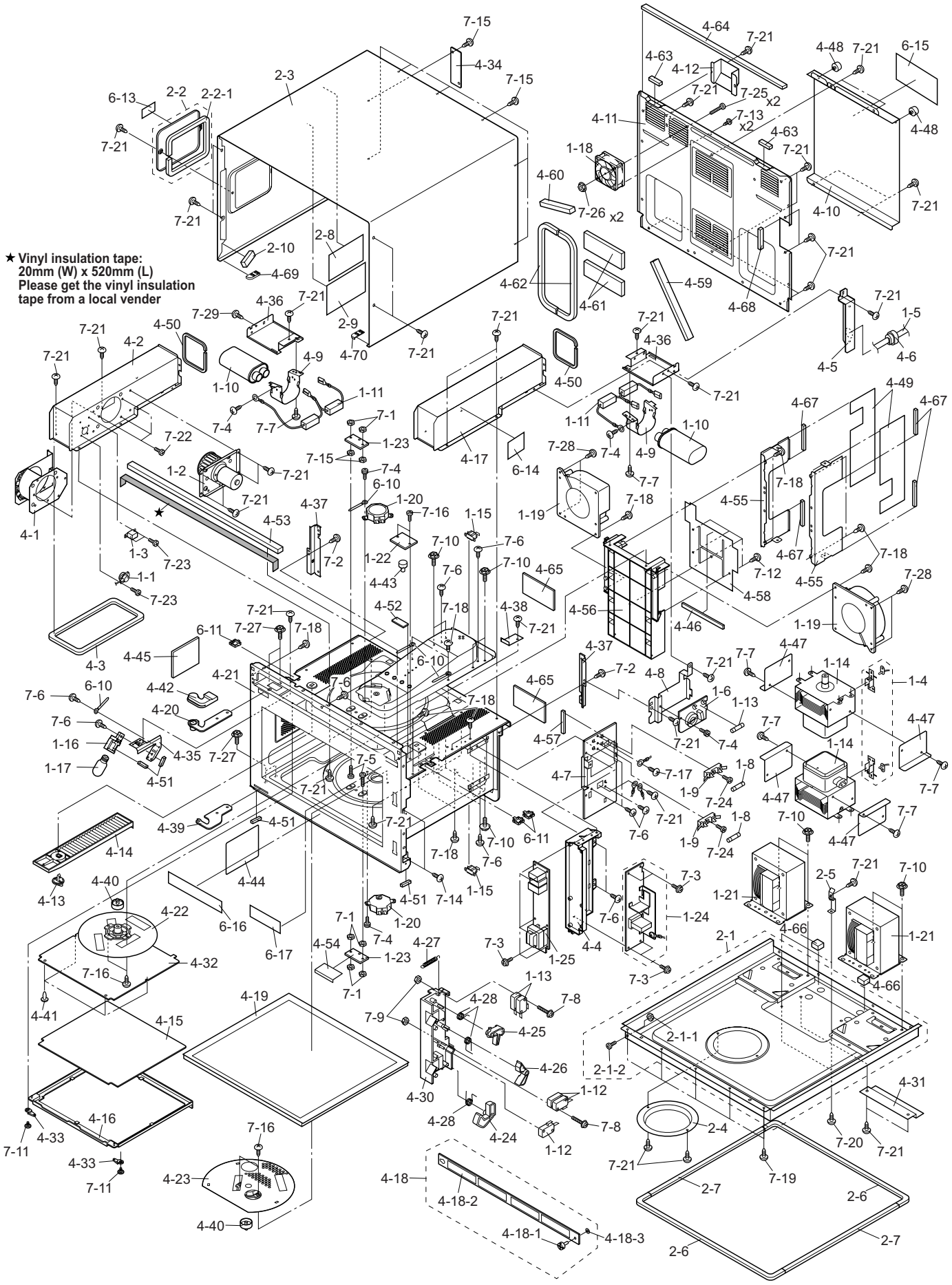
The contents are subject to change without notice.

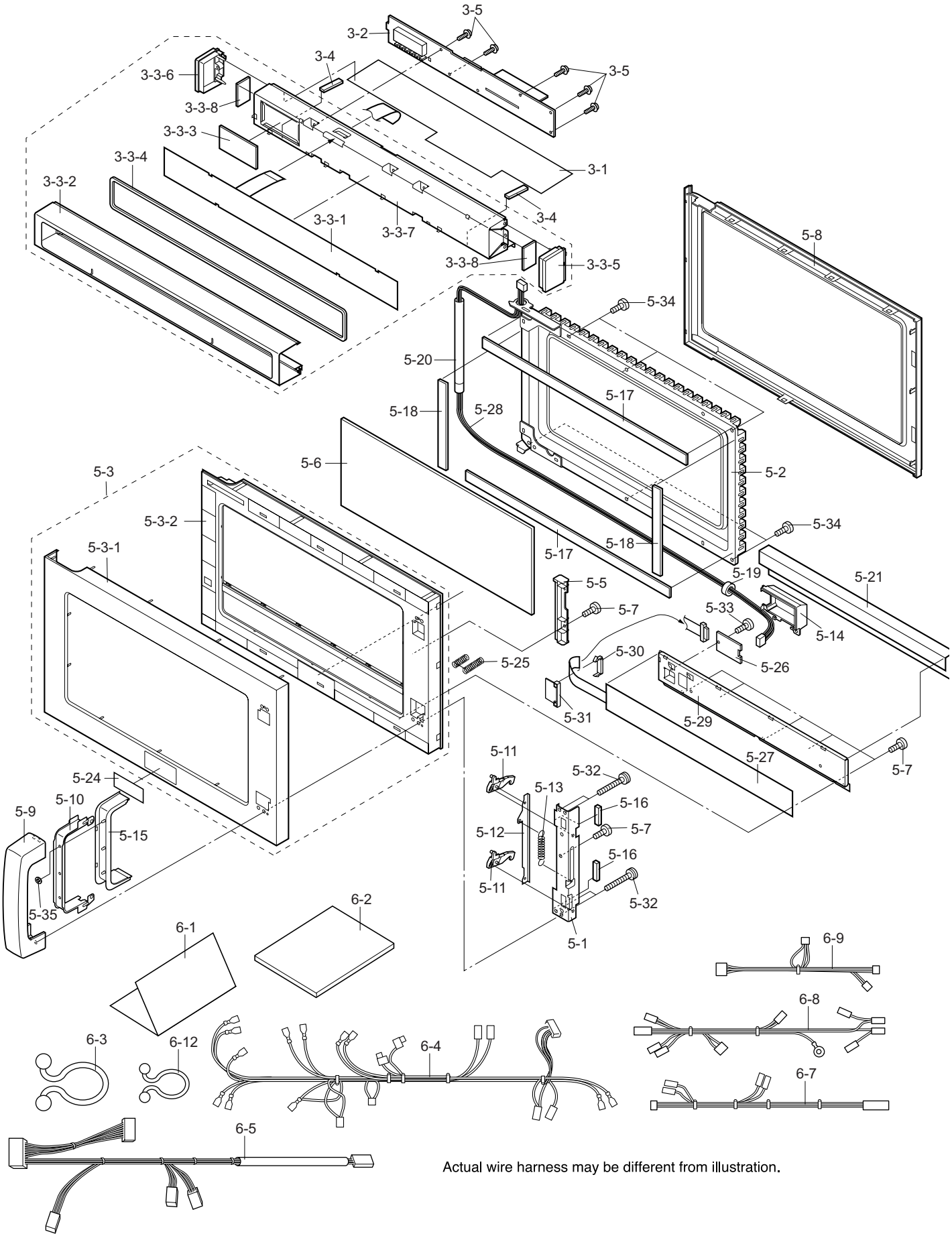
[1] OVEN PARTS


★ Vinyl insulation tape:
20mm (W) x 520mm (L)
Please get the vinyl insulation tape from a local vender

	NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
	[1] OVEN PARTS					
	ELECTRIC PARTS					
	1-1	FDTCTA239WRKZ	AV			Sensor assembly (Exhaust thermistor)
	1-2	FMOT-A031WRKZ	BP			Exhaust motor assembly
	1-3	QFS-TA015WRE0	AG			Temperature fuse 120C (Oven)
	1-4	DH-HZA017WRKZ	AY			Magnetron thermistor assembly
	1-5	FACCDA122WREZ	BG			Power supply cord
	1-6	FPWBFA383WRKZ	AN			Noise filter
	1-8	QFS-BA011WRE0	AE			UL fuse 12A
	1-9	QFSHDA009WRE0	AG			Fuse holder
⚠	1-10	RC-QZA322WRZZ	AW			High voltage capacitor
⚠	1-11	FH-DZA145WRZZ	AP			High voltag rectifier assembly
	1-12	QSW-MA085WRE0	AF			Secondary interlock/Door sensing switches
	1-13	FFS-BA033WRKZ	--			Monitor switch (V-5220Q) and fuse (20A) assembly
⚠ *	1-14	RV-MZA358WRZZ	BG			Magnetron
	1-15	QFS-TA014WRE0	AG			Temperature fuse 150C (Magnetron)
	1-16	QSOCLA026WRZZ	AF			Oven lamp socket
	1-17	RLMPTA086WRZZ	AL			Oven lamp
	1-18	RMOT-A016WRZZ	AP			Fan motor (DC) (Exhaust fan)
	1-19	RMOT-A026WRZZ	BE			Fan motor
	1-20	RMOTDA209WRE0	AR			Stirrer motor (Antenna motor)
⚠	1-21	RTRN-A768WRZZ	BQ			Power transformer
	1-22	DPWB-A570DRKZ	BA			Microwave sensor unit
	1-23	DPWB-A571DRKZ	BA			Antenna sensor unit
	1-24	DPWB-A565DRKZ	BF			Power unit (Switching power supply unit)
	1-25	DPWB-A568DRKZ	BH			Relay unit
	CABINET PARTS					
	2-1	DDAi-A214WRKZ	BM			Bottom plate assembly
	2-1-1	XNES740-32000	AC			Nut; 4mm x 3.2mm
	2-1-2	LX-BZA179WREZ	AL			Special screw
	2-2	FFTASA076WRYZ	AM			Oven lamp access cover
	2-2-1	PCUSUA651WRPZ	AD			Cushion
	2-3	GCABUB125WRPZ	BN			Outer case cabinet
	2-4	GCOVHA526WRPZ	AH			Motor protect cover
	2-5	LANGKB285WRPZ	AG			Cavity fixing plate
	2-6	PSHEGA011WREZ	AM			Rubber sheet L
	2-7	PSHEPB279WREZ	AH			Rubber sheet S
	2-8	TMAPCA783WRRZ	AF			Schematic diagram
	2-9	PFPF-A299WREZ	AL			Damper sheet
	2-10	PCUSGA756WRPZ	AD			Cabinet cushion
	OVEN PARTS					
	4-1	FCAS-A026WRYZ	AR			Fan case assembly
	4-2	DDUC-A071WRKZ	AV			Exhaust duct assembly
	4-3	PCUSGA721WRPZ	AG			Cushion
	4-4	LHLD-A314WRFZ	AN			PWB holder
	4-5	LANGQA694WRWZ	AM			AC cord angle
	4-6	LBSHC0006YBE0	AD			Cord bushing
	4-7	LANGQA699WRPZ	AK			Noise filter angle
	4-8	LANGQA734WRPZ	AH			Filter angle
	4-9	LBNDKA163WRPZ	AK			HV capacitor band
	4-10	GCOVAA399WRWZ	AS			MG exhaust cover
	4-11	GCOVAA398WRTZ	AW			Rear cover
	4-12	PGiDHA069WRPZ	AF			Exhaust cover
	4-13	JKNBKA801WRFZ	AS			Splash cover knob
	4-14	PCOVPA479WRFZ	BB			Splash cover
	4-15	GCOVPA023WRPZ	BF			Cover
	4-16	PCOVPA515WRFZ	AY			Frame
	4-17	DDUC-A072WRKZ	AV			Intake duct assembly
	4-18	FFiL-A014WRKZ	BA			air fillter unit
	4-18-1	LX-BZA178WREZ	AM			Filter stopper R
	4-18-2	PFiL-A040WRYZ	AW			Air fillter
	4-18-3	XREUW40-06000	AA			Ring
	4-19	FGLSPA069WRFZ	BT			Oven tray assembly
	4-20	FHNG-A370WRYZ	AT			Upper hinge assy
*	4-21	**********	**			Oven cavity assembly (Not a replaceable part)
	4-22	FPLT-A025WRYZ	AZ			Upper antenna assembly
	4-23	FPLT-A026WRYZ	BA			Lower antenna assembly
	4-24	MLEVCA001WRFZ	AG			Switch lever C
	4-25	MLEVPA279WRFZ	AG			Switch lever A
	4-26	MLEVPA280WRFZ	AG			Switch lever B
	4-27	MSPRCA165WREZ	AC			Latch spring A
	4-28	MSPRCA166WREZ	AC			Latch spring B
*	4-30	PHOK-A164WRFZ	AM			Latch hook
	4-31	GCOVHA527WRPZ	AG			Bottom cover
	4-32	GCOVPA020WRPZ	AV			Antenna cover
	4-33	JKNBKA800WRFZ	AM			Antenna cover knob
	4-34	LANGKB292WRPZ	AM			Support angle
	4-35	LANGQA671WRPZ	AM			Lamp holder angle
	4-36	LANGQA696WRPZ	AF			Capacitor unit angle
	4-37	LANGQA702WRPZ	AM			Motor fixing angle
	4-38	LSUB-A137WRPZ	AE			Face support angle
	4-39	MHNG-A592WRPZ	AP			Lower hinge
	4-40	NSFTPA045WRFZ	AN			Antenna shaft
	4-41	PCLiC0018WRE0	AB			Clip I

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[1] OVEN PARTS					
4-42	PCOVPA480WRFZ	AG			Hinge cover
4-43	PCOVPA496WRFZ	AK			Sensor cover
4-44	PFiLWA064WRPZ	AF			Lamp filter
4-45	PGLSPA720WREZ	AH			Lamp glass
4-46	PCUSGA761WRPZ	AE			Cushion
4-47	PSKR-A462WRPZ	AF			Partition angle S
4-48	GLEGPA033WRE0	AA			Leg
4-49	GCOVPA022WRPZ	AG			Partition cover
4-50	PCUSGA745WRPZ	AD			Cushion B
4-51	PCUSGA750WRPZ	AC			Lamp cushion
4-52	PCUSGA751WRPZ	AC			Cav top cushion
4-53	PCUSGA752WRPZ	AD			Cav face cushion
4-54	PSHEPB323WREZ	AF			Insertion barrer
4-55	PSKR-A464WRPZ	AK			Partition angle L
4-56	PDUC-B056WRFZ	AN			Mag cool duct A
4-57	PCUSGA757WRPZ	AF			Filter cushion
4-58	PDUC-B046WRPZ	AK			Mag cool duct B
4-59	PCUSGA742WRPZ	AF			Rear cushion A
4-60	PCUSGA743WRPZ	AF			Rear cushion B
4-61	PCUSGA744WRPZ	AF			Rear cushion C
4-62	PCUSGA746WRPZ	AG			Rear cushion D
4-63	PCUSGA747WRPZ	AD			Rear cushion E
4-64	PCUSGA748WRPZ	AF			Rear cushion F
4-65	PCUSGA758WRPZ	AN			Cav back sheet
4-66	PCUSGA765WRPZ	AC			Cushion
4-67	PCUSGA766WRPZ	AC			Cushion
4-68	PCUSGA767WRPZ	AC			Cushion
4-69	PCOVPA522WRFZ				Edge cap L
4-70	PCOVPA523WRFZ				Edge cap R
MISCELLANEOUS					
6-10	LBNDKA166WREZ	AD			Wire holder
6-11	LHLDWA063WREZ	AF			Wire holder
6-13	TCAUAA316WRRZ	AH			caution label
6-14	TCAUAA312WRRZ	AF			monitor caution
6-15	TCAUAA313WRRZ	AG			hwc caution
6-16	TCAUAA314WRRZ	AF			caution label
6-17	TCAUAA315WRRZ	AG			user caution label
SCREWS, NUTS AND WASHE					
7-1	LX-NZ0061WRE0	AA			Nut : 4mm x 3.2mm
7-2	XHPS740P08000	AB			Screw : 4mm x 8mm
7-3	XEPS730P08XS0	AB			Screw : 3mm x 8mm
7-4	XHPS740P08K00	AB			Screw : 4mm x 8mm
7-5	XBTUW40P12000	AB			Screw : 4mm x 12mm
7-6	XOTS740P08000	AA			Screw : 4mm x 8mm
7-7	XHTS740P08000	AC			Screw : 4mm x 8mm
7-8	XBPS730P28KS0	AB			Screw : 3mm x 28mm
7-9	XNES730-24000	AE			nut : 3mm x 2.4mm
7-10	LX-BZA164WREZ	AC			HEX cup-screw
7-11	LX-BZA181WREZ	AH			Special screw
7-12	XETS740P08000	AA			Screw : 4mm x 8mm
7-13	XHPS730P06000	AB			Screw : 3mm x 6mm
7-14	LX-CZ0052WRE0	AA			Special screw
7-15	XNGUW40-24000	AE			Nut : 4mm x 2.4mm
7-16	LX-BZA132WREZ	AB			Special screw
7-17	LX-BZA138WREZ	AB			Special screw
7-18	XETS740P10000	AA			Screw : 4mm x 10mm
7-19	LX-CZA085WREZ	AB			Special screw
7-20	XHTWW40P08000	AC			Screw : 4mm x 8mm
7-21	XOTWW40P08000	AB			Screw: 4mm x 8mm
7-22	XFPWW30P06000	AD			Screw : 3mm x 6mm
7-23	XCBWW30P08000	AB			Screw : 3mm x 8mm
7-24	XCPS740P08000	AB			Screw : 4mm x 8mm
7-25	XBPS740P35000	AD			Screw : 4mm x 35mm
7-26	XNES740-32000	AC			Nut; 4mm x 3.2mm
7-27	LX-BZA169WREZ	AC			Special screw
7-28	XOTWW40P10000	AA			Screw : 4mm x 10mm
7-29	XCHWW40P08000	AB			Screw : 4mm x 8mm

[2] DOOR AND CONTROL PANEL PARTS



Actual wire harness may be different from illustration.

	NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
	[2] DOOR AND CONTROL PANEL PARTS					
	CONTROL PANEL PARTS					
	3-1	PSHEPB332WREZ	AN			CPU protect sheet
	3-2	DPWB-A573DRKZ	BQ			Control unit
	3-3-1	FUNTKB179WREZ	AU			Key unit
	3-3-2	GCOVAA389WRPZ	AR			C/P case
	3-3-3	GMADiA189WRFZ	AL			Display window
	3-3-4	GWAKPB142WRFZ	AK			Panel grille
	3-3-5	HDECQA372WRMZ	AL			Panel cap R
	3-3-6	HDECQA373WRMZ	AL			Panel cap L
	3-3-7	LANGQA676WRWZ	AP			Panel fixing plate
	3-3-8	PCUSGA753WRPZ	AF			CP cushion A
	3-4	PCUSGA754WRPZ	AC			CP cushion B
	3-5	XCPS730P08XS0	AC			Screw : 3mm x 8mm
	DOOR PARTS					
*	5-1	FANGKA225WRYZ	AN			Latch angle assembly
*	5-2	FDORFA436WRYZ	BB			Door panel sub assembly
	5-3	FCOV-A018WRKZ	BE			Door case assembly
*	5-3-1	GCOVAA392WRYZ	BA			Door case
*	5-3-2	GWAK-A012WRFZ	AX			Door frame
	5-5	LSTPPA261WRFZ	AG			Glass stopper
	5-6	PGLSPA727WREZ	AS			Front door glass
	5-7	XEPS740P08000	AB			Screw : 4mm x 8mm
*	5-8	GCOVHA525WRFZ	AS			Choke cover
	5-9	JHNDMA058WRMZ	BD			Door handle
	5-10	JHNDMA062WRPZ	AK			Handle lever
*	5-11	LSTPPA260WRFZ	AG			Latch head
	5-12	MLEVFA091WRWZ	AG			Latch lever
	5-13	MSPRTA190WRE0	AD			Latch spring
	5-14	PCOVPA476WRFZ	AG			Board cover
	5-15	PCOVPA477WRFZ	AM			Handle cover
	5-16	PCUSGA720WRPZ	AG			Latch ag cushion
	5-17	PCUSGA736WRPZ	AE			Door cushion L
	5-18	PCUSGA737WRPZ	AF			Door cushion S
	5-19	PCUSGA738WRPZ	AC			Harness cushion
	5-20	PPiPPA017WRFZ	AF			Pipe
	5-21	PSHEPB325WREZ	AK			Key protect cover
	5-24	HBDGCA129WRRZ	AH			Door badge
	5-25	MSPRCA174WREZ	AF			Earth spring
	5-26	DPWB-A569DRKZ	BA			Switch unit
	5-27	FUNTKB180WREZ	AS			Key unit
	5-28	FW-VZC153WREZ	AS			Harnes (Door key harness)
	5-29	LANGTA440WRPZ	AN			Key fixing plate
	5-30	LRTNPA001DRZZ	AF			connector
	5-31	LRTNPA002DRZZ	AF			connector
	5-32	XBPS740P25K00	AC			Screw : 4mm x 25mm
	5-33	XCPS730P08XS0	AC			Screw : 3mm x 8mm
	5-34	XEPS740P10000	AA			Screw : 4mm x 10mm
	5-35	LX-RZ180AKRE0	AA			Special ring
	MISCELLANEOUS					
	6-1	TCADRA030WRRZ	AF			Touch guide
	6-2	TiNSEB154WRRZ	AP			Instruction book
	6-3	LHLDWA013WRE0	AC			Purce lock
	6-4	FW-VZC169WREZ	BK			Main wire harness
	6-5	FW-VZC160WREZ	AZ			Harnes (CPU harnes)
	6-7	FW-VZC155WREZ	AG			Harnes (Oven harness)
	6-8	FW-VZC168WREZ	AS			Harnes (DC harness 12)
	6-9	FW-VZC157WREZ	AR			Harness (Sensor harness)
	6-12	LHLDWA011WRE0	AB			Purce lock M

■INDEX

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
【 D 】				
DDAi-A214WRKZ	1-2-1	BM		
DDUC-A071WRKZ	1-4-2	AV		
DDUC-A072WRKZ	1-4-17	AV		
DH-HZA017WRKZ	1-1-4	AY		
DPWB-A565DRKZ	1-1-24	BF		
DPWB-A568DRKZ	1-1-25	BH		
DPWB-A569DRKZ	2-5-26	BA		
DPWB-A570DRKZ	1-1-22	BA		
DPWB-A571DRKZ	1-1-23	BA		
DPWB-A573DRKZ	2-3-2	BQ		
【 F 】				
FACCDA122WREZ	1-1-5	BG		
FANGKA225WRYZ	2-5-1	AN		
FCAS-A026WRYZ	1-4-1	AR		
FCOV-A018WRKZ	2-5-3	BE		
FDORFA436WRYZ	2-5-2	BB		
FDTCTA239WRKZ	1-1-1	AV		
FFiL-A014WRKZ	1-4-18	BA		
FFS-BA033WRKZ	1-1-13	--		
FFTASA076WRYZ	1-2-2	AM		
FGLSPA069WRFZ	1-4-19	BT		
FH-DZA145WRZZ	1-1-11	AP		
FHNG-A370WRYZ	1-4-20	AT		
FMOT-A031WRKZ	1-1-2	BP		
FPLT-A025WRYZ	1-4-22	AZ		
FPLT-A026WRYZ	1-4-23	BA		
FPWBFA383WRKZ	1-1-6	AN		
FUNTKB179WREZ	2-3-3-1	AU		
FUNTKB180WREZ	2-5-27	AS		
FW-VZC153WREZ	2-5-28	AS		
FW-VZC155WREZ	2-6-7	AG		
FW-VZC157WREZ	2-6-9	AR		
FW-VZC160WREZ	2-6-5	AZ		
FW-VZC168WREZ	2-6-8	AS		
FW-VZC169WREZ	2-6-4	BK		
【 G 】				
GCABUB125WRPZ	1-2-3	BN		
GCOVAA389WRPZ	2-3-3-2	AR		
GCOVAA392WRYZ	2-5-3-1	BA		
GCOVAA398WRTZ	1-4-11	AW		
GCOVAA399WRWZ	1-4-10	AS		
GCOVHA525WRFZ	2-5-8	AS		
GCOVHA526WRPZ	1-2-4	AH		
GCOVHA527WRPZ	1-4-31	AG		
GCOVPA020WRPZ	1-4-32	AV		
GCOVPA022WRPZ	1-4-49	AG		
GCOVPA023WRPZ	1-4-15	BF		
GLEGPA033WRE0	1-4-48	AA		
GMADiA189WRFZ	2-3-3-3	AL		
GWAK-A012WRFZ	2-5-3-2	AX		
GWAKPB142WRFZ	2-3-3-4	AK		
【 H 】				
HBDGCA129WRRZ	2-5-24	AH		
HDECQA372WRMZ	2-3-3-5	AL		
HDECQA373WRMZ	2-3-3-6	AL		
【 J 】				
JHNDMA058WRMZ	2-5-9	BD		
JHNDMA062WRPZ	2-5-10	AK		
JKNBKA800WRFZ	1-4-33	AM		
JKNBKA801WRFZ	1-4-13	AS		
【 L 】				
LANGKB285WRPZ	1-2-5	AG		
LANGKB292WRPZ	1-4-34	AM		
LANGQA671WRPZ	1-4-35	AM		
LANGQA676WRWZ	2-3-3-7	AP		
LANGQA694WRWZ	1-4-5	AM		
LANGQA696WRPZ	1-4-36	AF		
LANGQA699WRPZ	1-4-7	AK		
LANGQA702WRPZ	1-4-37	AM		
LANGQA734WRPZ	1-4-8	AH		
LANGTA440WRPZ	2-5-29	AN		
LBNDKA163WRPZ	1-4-9	AK		
LBNDKA166WREZ	1-6-10	AD		
LBSHC0006YBE0	1-4-6	AD		
LHLD-A314WRFZ	1-4-4	AN		
LHLDWA011WRE0	2-6-12	AB		
LHLDWA013WRE0	2-6-3	AC		
LHLDWA063WREZ	1-6-11	AF		

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
LRTNPA001DRZZ	2-5-30	AF		
LRTNPA002DRZZ	2-5-31	AF		
LSTPPA260WRFZ	2-5-11	AG		
LSTPPA261WRFZ	2-5-5	AG		
LSUB-A137WRPZ	1-4-38	AE		
LX-BZA132WREZ	1-7-16	AB		
LX-BZA138WREZ	1-7-17	AB		
LX-BZA164WREZ	1-7-10	AC		
LX-BZA169WREZ	1-7-27	AC		
LX-BZA178WREZ	1-4-18-1	AM		
LX-BZA179WREZ	1-2-1-2	AL		
LX-BZA181WREZ	1-7-11	AH		
LX-CZ0052WRE0	1-7-14	AA		
LX-CZA085WREZ	1-7-19	AB		
LX-NZ0061WRE0	1-7-1	AA		
LX-RZ180AKRE0	2-5-35	AA		
【 M 】				
MHNG-A592WRPZ	1-4-39	AP		
MLEVCA001WRFZ	1-4-24	AG		
MLEVFA091WRWZ	2-5-12	AG		
MLEVPA279WRFZ	1-4-25	AG		
MLEVPA280WRFZ	1-4-26	AG		
MSPRCA165WREZ	1-4-27	AC		
MSPRCA166WREZ	1-4-28	AC		
MSPRCA174WREZ	2-5-25	AF		
MSPRTA190WRE0	2-5-13	AD		
【 N 】				
NSFTPA045WRFZ	1-4-40	AN		
【 P 】				
PCLiC0018WRE0	1-4-41	AB		
PCOVPA476WRFZ	2-5-14	AG		
PCOVPA477WRFZ	2-5-15	AM		
PCOVPA479WRFZ	1-4-14	BB		
PCOVPA480WRFZ	1-4-42	AG		
PCOVPA496WRFZ	1-4-43	AK		
PCOVPA515WRFZ	1-4-16	AY		
PCOVPA522WRFZ	1-4-69			
PCOVPA523WRFZ	1-4-70			
PCUSGA720WRPZ	2-5-16	AG		
PCUSGA721WRPZ	1-4-3	AG		
PCUSGA736WRPZ	2-5-17	AE		
PCUSGA737WRPZ	2-5-18	AF		
PCUSGA738WRPZ	2-5-19	AC		
PCUSGA742WRPZ	1-4-59	AF		
PCUSGA743WRPZ	1-4-60	AF		
PCUSGA744WRPZ	1-4-61	AF		
PCUSGA745WRPZ	1-4-50	AD		
PCUSGA746WRPZ	1-4-62	AG		
PCUSGA747WRPZ	1-4-63	AD		
PCUSGA748WRPZ	1-4-64	AF		
PCUSGA750WRPZ	1-4-51	AC		
PCUSGA751WRPZ	1-4-52	AC		
PCUSGA752WRPZ	1-4-53	AD		
PCUSGA753WRPZ	2-3-3-8	AF		
PCUSGA754WRPZ	2-3-4	AC		
PCUSGA756WRPZ	1-2-10	AD		
PCUSGA757WRPZ	1-4-57	AF		
PCUSGA758WRPZ	1-4-65	AN		
PCUSGA761WRPZ	1-4-46	AE		
PCUSGA765WRPZ	1-4-66	AC		
PCUSGA766WRPZ	1-4-67	AC		
PCUSGA767WRPZ	1-4-68	AC		
PCUSUA651WRPZ	1-2-2-1	AD		
PDUC-B046WRPZ	1-4-58	AK		
PDUC-B056WRFZ	1-4-56	AN		
PFiL-A040WRYZ	1-4-18-2	AW		
PFiLWA064WRPZ	1-4-44	AF		
PFPF-A299WREZ	1-2-9	AL		
PGiDHA069WRPZ	1-4-12	AF		
PGLSPA720WREZ	1-4-45	AH		
PGLSPA727WREZ	2-5-6	AS		
PHOK-A164WRFZ	1-4-30	AM		
PPiPPA017WRFZ	2-5-20	AF		
PSHEGA011WREZ	1-2-6	AM		
PSHEPB279WREZ	1-2-7	AH		
PSHEPB323WREZ	1-4-54	AF		
PSHEPB325WREZ	2-5-21	AK		
PSHEPB332WREZ	2-3-1	AN		
PSKR-A462WRPZ	1-4-47	AF		

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
PSKR-A464WRPZ	1-4-55	AK		
【 Q 】				
QFS-BA011WRE0	1-1-8	AE		
QFSHDA009WRE0	1-1-9	AG		
QFS-TA014WRE0	1-1-15	AG		
QFS-TA015WRE0	1-1-3	AG		
QSOCLA026WRZZ	1-1-16	AF		
QSW-MA085WRE0	1-1-12	AF		
【 R 】				
RC-QZA322WRZZ	1-1-10	AW		
RLMPTA086WRZZ	1-1-17	AL		
RMOT-A016WRZZ	1-1-18	AP		
RMOT-A026WRZZ	1-1-19	BE		
RMOTDA209WRE0	1-1-20	AR		
RTRN-A768WRZZ	1-1-21	BQ		
RV-MZA358WRZZ	1-1-14	BG		
【 T 】				
TCADRA030WRRZ	2-6-1	AF		
TCAUAA312WRRZ	1-6-14	AF		
TCAUAA313WRRZ	1-6-15	AG		
TCAUAA314WRRZ	1-6-16	AF		
TCAUAA315WRRZ	1-6-17	AG		
TCAUAA316WRRZ	1-6-13	AH		
TiNSEB154WRRZ	2-6-2	AP		
TMAPCA783WRRZ	1-2-8	AF		
【 X 】				
XBPS730P28KS0	1-7-8	AB		
XBPS740P25K00	2-5-32	AC		
XBPS740P35000	1-7-25	AD		
XBTUW40P12000	1-7-5	AB		
XCBWW30P08000	1-7-23	AB		
XCHWW40P08000	1-7-29	AB		
XCPS730P08XS0	2-3-5	AC		
〃	2-5-33	AC		
XCPS740P08000	1-7-24	AB		
XEPS730P08XS0	1-7-3	AB		
XEPS740P08000	2-5-7	AB		
XEPS740P10000	2-5-34	AA		
XETS740P08000	1-7-12	AA		
XETS740P10000	1-7-18	AA		
XFPWW30P06000	1-7-22	AD		
XHPS730P06000	1-7-13	AB		
XHPS740P08000	1-7-2	AB		
XHPS740P08K00	1-7-4	AB		
XHTS740P08000	1-7-7	AC		
XHTWW40P08000	1-7-20	AC		
XNES730-24000	1-7-9	AE		
XNES740-32000	1-7-26	AC		
〃	1-2-1-1	AC		
XNGUW40-24000	1-7-15	AE		
XOTS740P08000	1-7-6	AA		
XOTWW40P08000	1-7-21	AB		
XOTWW40P10000	1-7-28	AA		
XREUW40-06000	1-4-18-3	AA		

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